7th ISSMART 2025

International Seminar on Smart Molecule of Natural Resource

ABSTRACT BOOK

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"Advancing Smart Molecular Nutrition for Promoting Human Health and Longevity"

BIOCHEMISTRY - BIOINFORMATICS - BIOPHYSICAL SCIENCE - BIOMEDICAL ENGINEERING - HERBAL MEDICINE - MEDICAL PHYSICS - MOLECULER BIOLOGY - NEUROSCIENCES - NUTRIGENOMICS - NUTRIGENETICS

In collaboration with:

MC 1.1
MIPA CENTER
Brawijaya University

6 - 7 August 2025

OPENING SPEECH RECTOR OF UNIVERSITAS BRAWIJAYA

Assalamualaikum Warahmatullahi Wabarakatuh,

Dear Head of SMONAGENES Research Center, Chairman of Committee 7th International Seminar on Smart Molecules of Natural Resources (ISSMART) 2025, and all Speakers:

1. Prof. Katsuhiro Miyajima, Ph.D. (Tokyo University of Agriculture, Japan)
2. Prof. Renu Wadhwa, Ph.D. (National Institute of Advanced Industrial Science and Technology (AIST), Tsukuba, Japan)
3. Assoc. Prof. Dr. Noraini ahmad (Universitas Malaya, Malaysia)
4. Prof. Hui-Chun Wang (Kaohsiung Medical University, Taiwan)

On behalf of the organizing committee of 7th ISSMART 2025, I would like to extend my warmest welcome to all delegates of 7th ISSMART 2025. Welcome to Malang, one of the educational cities in Indonesia. Universitas Brawijaya is the largest university in Malang as well as the top ten best universities in Indonesia.

ISSMART has been running for 7 years, and during the last 2 years it collaborated with DAILAB PIKNIKH, to have a joint conference. This makes ISSMART 2025 an exceptional event. ISSMART 2025 has attracted participants from a diverse range of domestic and foreign universities (Malaysia: Universiti Terengganu Malaysia, Universiti Malaya | Japanese: Tokyo University of Agriculture, Kyoto University, Japanese Tobacco Institute | Taiwan: Kaohsiung Medical University | Indonesia: Universitas Brawijaya, Universitas Jember, Universitas Padjadjaran, Indonesian Oil Palm Research Institute, UPN Veteran Yogyakarta, Universitas Ahmad Dahlan, Universitas Airlangga). This is a clear indication of the broad appeal and relevance of the program within the academic community. The participation of these universities underscores the importance of ISSMART as a platform for collaboration and knowledge-sharing across different institutions and geographies.

ISSMART is held annually, starting six years ago with ISSMART 2019. This conference is organized by the Research Centre of Smart Molecules of Natural Genetic Resources (SMONAGENES). SMONAGENES is one of the Research Centres at Brawijaya University. SMONAGENES is also one of the leading Research Centres at Brawijaya University. Also, one of the top five research centers at Brawijaya University.

7th ISSMART 2025 aimed to promote mutual exchange between scientists and experts, to discuss new research results in the fields of theoretical and experimental smart molecules from natural resources. The seminar facilitates researchers and academic members or experts from universities, government institutions, private sectors, and non-government organizations to share their knowledge through discussion in plenary sessions, and parallel sessions of oral presentation.

I believe that 7th ISSMART should bring advantages for all participants. They will learn many new aspects of research in the related topics, either from keynote speakers or general participants. In addition, collaborations between Universitas Brawijaya and other universities both from Indonesia and overseas can be initiated.

To reach the most potential of research studies, ISSMART 2025 is going to be held as a hybrid conference. Finally, I would like to express my gratitude to the keynote speakers, for the expertise and knowledge they will bring to the conference, and of course the inevitable discussion of their talks. Special thanks are also extended to the members of the organizing committee for their hard work in bringing this conference together. Last but not least, I would like to thank all of the conference participants who will contribute to making this the most memorable ISSMART yet.

Please enjoy ISSMART 2025 and have a delightful seminar.

Wassalamu ‘alaikum Warahmatullahi Wabarakatuh

Sincerely yours,

Rector of Universitas Brawijaya

WELCOME MESSAGE ISSMART 2025 CHAIRMAN

As the chairperson of the organizing committee and on behalf of the organizing committee, it's my great pleasure to welcome all keynote speakers, plenary speakers, invited speakers, speakers from DAILAB PIKNIKH, distinguished guests and participants, to the 7th International Seminar on Smart Molecule of Natural Resources (ISSMART) 2025. The ISSMART is an annual scientific meeting organized by the Research Center of Smart Molecules of Natural Genetics Resources (SMONAGENES), Universitas Brawijaya. This meeting aimed to promote mutual exchange between researchers and experts to discuss innovative ideas in scientific research. Therefore, this conference is the gate to the leading innovation and milestone in collaboration with many countries.

This year, the 7th ISSMART 2025 comes with the theme of "Advancing Smart Molecular Nutrition for Promoting Human Health and Longevity" which covers broad range of research field with various scopes, including biochemistry, molecular biology, bioinformatics, biophysical science, biomedical engineering, herbal medicine, medical physics, neuroscience, nutrigenomic and nutrigenetic. This theme is intended to promote recent advances in the utilization of smart molecules for promoting human health and longevity. This conference will feature a diverse program, including plenary and invited lectures, symposium, and oral presentations.

There will be more 50 speakers from local and abroad among the 150 people who registered for this hybrid conference, including invited speakers from DAILAB PIKNIKH series 64. All participants are coming from various areas of studies and from different countries and institutions, including Japan, China, Malaysia, Taiwan, India, and Indonesia. Several institutions participating in this conference, such as Kyoto University, Tokyo University of Agriculture, Japan Tobacco, National Institute of Advanced Industrial Science & Technology, Shanghai Institute for Biomedical and Pharmaceutical, Universiti Malaya, Universiti Malaysia Terengganu, Kaohsiung Medical University, Indian Institute of Technology Guwahati, The National Research and Innovation Agency (BRIN), Universitas Brawijaya, Universitas Indonesia, Universitas Airlangga, Universitas Negeri Malang, Universitas Jember, Universitas Padjajaran, Universitas Pembangunan Nasional, Universitas Sam Ratulangi, Universitas Ahmad Dahlan, and Indonesian Oil Palm Research Institute.

I would like to thank our keynote speakers:

1. Prof. Katsuhiro Miyajima (Tokyo University of Agriculture, Japan)
2. Prof. Renu Wadhwa (National Institute of Advanced Industrial Science and Technology, Japan)
3. Prof. Hui-Cun Yang (Kaohsiung Medical University, Taiwan)
4. Assoc. Prof. ChM. Dr. Noraini Ahmad (Universiti Malaya, Malaysia)

I would also like to convey our heartfelt gratitude to the organizing committee and all those who have tirelessly contributed to the successful organization of this conference through their exceptional teamwork. We hope you will thoroughly enjoy the conference and make the most of this opportunity to discover the latest advances in smart molecules, establish new international connections, reconnect with old friends, and cultivate new friendships. On behalf of the organizers, I would like to express our deep appreciation for your involvement, and we wish you a delightful and enriching experience during your stay in Malang.

Finally, we have tried to do the best preparation for the 7th ISSMART 2025. Nevertheless, there is nothing completely perfect in the world, including this conference. Therefore, please accept our deep apologies for any inconvenience found in this conference.

Thank you very much.

Chairperson of the Organizing Committee

Eko Suyanto, S.Si., M.Sc., Ph.D.

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SCIENTIFIC PROGRAM OF THE 7th ISSMART

Date: Wednesday (6th August 2025) – Thursday (7th August 2025)

Theme: "Advancing Smart Molecular Nutrition for Promoting Human Health and Longevity"

Place: Banquet Room MC1.1, MIPA Center, FMIPA, Universitas Brawijaya (Hybrid Conference)

Keynote speaker:

1. Prof. Katsuhiro Miyajima, PhD (Department of Nutritional Science and Food Safety-Tokyo University of Agriculture, Japan).
2. Prof. Renu Wadhwa, Ph.D (National Institute of Advanced Industrial Science & Technology (AIST), Tsukuba, Japan
3. Assoc. Prof. ChM. Dr. Noraini Ahmad (Universiti Malaya, Malaysia)
4. Prof. Hui-Chun Wang (Graduate Institute of Natural Products Kaohsiung Medical University, Taiwan)

Plenary speaker:

1. Prof. Rr. Retno Widyowati, S.Si., Apt., M.Pharm., Ph.D. (Airlangga University)
2. Prof. Dr. Evi Susanti, S.Si., M.Si (Universitas Negeri Malang)
3. Prof. Drs. Sutiman Bambang Sumitro, SU., D.Sc (Universitas Brawijaya)
4. Prof. Dra. Fatchiyah, M.Kes., Ph.D. (Universitas Brawijaya)

Link Zoom Meeting for Plenary Session (Main Room)

Zoom link: https://univ-brawijaya.zoom.us/j/97456812272?pwd=APjoa03DIQtXQ2mAWq1rzGtatSTagJ.1

Meeting ID : 974 5681 2272

Passcode : 119251

DAY 1

Wednesday, 6th August 2025

PLENARY SESSION

07.30 – 07.50 WIB : Registration

07.50 – 07.55 WIB : Opening by Master of Ceremony
(MC: Shania Tahir and Mahawira Ignas)

07.55 – 08.00 WIB : National Anthem

08.00 – 08.10 WIB : Welcome speech from 7th ISSMART 2025 Chairperson

08.10 – 08.20 WIB : Opening speech from Rector Universitas Brawijaya

08.20 – 08.30 WIB : Photo Session

Keynote speaker speech Session-1

Moderator: Dr. dr. Nia Kurnianingsih, M. Biomed.		
Keynote Speaker 1 08:30 - 09:00	Title	**Investigation of Optimal Conditions for Short-term Experiments and Associated Changes in Inflammatory Parameters in Dextran Sulphate Sodium (DSS) Induced Colitis Model Mice**
	Speaker	**Prof. Katsuhiro Miyajima, PhD** *(Department of Nutritional Science and Food Safety-Tokyo University of Agriculture, Japan)*
Keynote Speaker 2 09:00 - 09:30	Title	**Molecular link between stress and cancer: interventions with small molecules**

	Speaker	**Prof. Renu Wadhwa, Ph.D** *(National Institute of Advanced Industrial Science & Technology (AIST), Tsukuba, Japan)*
09:30 – 09:40		Discussion

*Note: Certificate will be given just after the Keynote lecture

Keynote speaker speech Session-2

Moderator: Assoc. Prof. Anna Safitri, Ph.D		
Keynote Speaker 3 **09:40 - 10:10**	Title	**Innovative Drug Delivery: Development of Lipid-Based Niosomes containing *Brucea Javanica* for Diabetes Treatment**
	Speaker	**Assoc. Prof. ChM. Dr. Noraini Ahmad** *(University of Malaya, Malaysia)*
Keynote Speaker 4 **10:10 - 10:40**	Title	**Severinia buxifolia-isolated acridones inhibit lung cancer invasion and decrease HIFα protein synthesis involves 5'UTR-mediated translation inhibition**
	Speaker	**Prof. Hui-Chun Wang** *(Kaohsiung Medical University, Taiwan)*
10:40 – 10:50		Discussion

10.50 – 11.00 WIB : Presentation by Sponsor

Plenary speaker speech Session-1

Moderator: Regina Putri Virgirinia, S.Si., M.Sc., D.Sc.		
Plenary Speaker 1 11:00 – 11:20	Title	**Utilization of Fish Scale Waste as Raw Material for Nutraceuticals: An Innovative Solution for Arthritis Patients**
	Speaker	**Prof. Dr. Evi Susanti, S.Si., M.Si** *(Universitas Negeri Malang)*
Plenary Speaker 2 11:20 - 11:40	Title	**Hormesis, Wellness and Nano bubble Technology**
	Speaker	**Prof. Drs. Sutiman Bambang Sumitro, SU., D.Sc** *(Universitas Brawijaya)*
11:40 - 11:50	Discussion	
11:50 – 11:55	Awarding of certificates for plenary speaker	

12:00 – 13:00 WIB : Lunch Break

Plenary speaker speech Session-2

Moderator: Eko Suyanto Ph.D		
Plenary Speaker 3 13:00 – 13:20	Title	**Development of New Drug Discoveries from Natural Resources through Ethnomedicine Studies**
	Speaker	**Prof. Rr. Retno Widyowati, S.Si., Apt., M.Pharm., Ph.D.** *(Universitas Airlangga)*
Plenary Speaker 4	Title	**Development of Novel Natural Therapeutic Anticancer Agents Based on Native Plant Bioactive Compounds**

13:20 – 13:40	Speaker	**Prof. Fatchiyah, M.Kes., Ph.D** *(Universitas Brawijaya)*
13:40 - 13:50	Discussion	
13:50 – 13:55	Awarding of certificates for plenary speaker	

18.00 - 20.00 Dinner for Keynote and Plenary Speaker

DAY 2

Thursday, 7th August 2025

Link Zoom Meeting for Plenary Session (Main Room)

Zoom link : https://univ-brawijaya.zoom.us/j/97456812272?pwd=APjoa03DIQtXQ2mAWq1rzGtatSTagJ.1

Meeting ID : 974 5681 2272

Passcode : 119251

07.00 – 07.55 WIB : Registration

Room 1 (MC 1.1) Moderator: Muhamad Fahmi, S.Si., D.Sc.		
Time	Presenter	Title
08.00 – 08.15	Prof. Renu Wadhwa (AIST, Japan)	Cyclodextrin empowered small molecules from Propolis, Ashwagandha, and Cinnamon for managing stress and cancer: experimental evidence
08.15 – 08.30	Prof. Sunil Kaul (AIST, Japan)	Identification and validation of anti-stress activities of Alpha Lipoic Acid: relevance to healthy aging
08.30 – 08.45	Dr. Anissa Nofita Sari (BRIN, Indonesia)	Wi-A and CAPE Combination for Cancer and COVID-19 Management
08.45 – 08.50	Discussion	
08.50 – 09.05	Assoc. Prof. Anna Safitri, Ph.D (Universitas Brawijaya)	Targeted Drug Delivery Through Microencapsulation of Plant Extracts: Design, Characteristics, and Biological Efficacy
09.05 – 09.20	Assoc. Prof. Dr Fatimah Binti Hashim (Universiti Malaysia Terengganu)	Mechanisms of Functionalized Azo-Azomethine as Anti-Amoebic Compound and Its Reaction on Human Serum Albumin for Drug Development and Safety Screening
09.20 – 09.35	Muhamad Fahmi, S.Si., D.Sc (Universitas Brawijaya, Indonesia)	Identifying Biosynthetic Hotspots of Natural Products to Guide Conservation of Medicinal Resources

09.35 – 09.40	Discussion	
09.40 – 09.55	Wike Astrid Cahayani, S.Ked., M.Biomed. (Universitas Brawijaya, Indonesia)	Integrated Bibliometric Analysis of Herbal Neuroprotection Research (2010–2025): From Oxidative Stress to Molecular and Glial Mechanisms
09.55 – 10.10	dr. Febrina Friscilia (Universitas Brawijaya, Indonesia)	Seizure Semiology Profile of Epilepsy Patients at the Outpatient Neurology Clinic of RSSA Malang During June–September 2024
10.10 – 10.25	Erman Permana RajaGukGuk (Universitas Brawijaya, Indonesia)	Virtual Screening and Molecular Interaction of Kratom (*Mitragyna speciosa*) as a Drug Candidate for Parkinson's Disease
10.25 – 10.30	Discussion	
10.30 – 10.45	dr. Dody Riandono (Universitas Brawijaya, Indonesia)	Profile Of Low Back Pain Patients with Pulsed Radiofrequency Therapy at Saiful Anwar Hospital, East Java
10.45 – 11.00	Wardah Mufidah (Universitas Brawijaya, Indonesia)	Virtual Prediction of Potential Epitopes LNTX Proteins from King Cobra (*Ophiophagus hannah*) Venom for Vaccine-Based Antivenom Development
11.00 – 11.15	Shania Thahir (Universitas Brawijaya, Indonesia)	Production of N-terminal Catalytic Unit Maltase-Glucoamylase in *Pichia pastoris*
11.15 – 11.20	Discussion	
11.20 – 11.35	Mayuka Watanabe (Tokyo University of Agriculture, Japan)	Pathophysiological analysis of the ear in a mouse model of DNFB(2,4-dinitrofluorobenzene)-induced dermatitis
11.35 – 11.50	apt. Syarifatul Mufidah, Ph.D. (Universitas Ahmad Dahlan, Indonesia)	In Silico Screening of Flavonoid Glycosides and Their Aglycones as Potential PPARγ Modulators
11.50 – 12.05	Shinfa Auliya Ary Rahayu (Universitas Negeri Malang, Indonesia)	TP53 Expression in Breast Cancer and Fibroadenoma Mammae: A case study in RSAU Dr. Salamun Bandung

12.05 – 12.20	Dr. Kana Mardhiyyah, S.Si., M.Biomed (Universitas Brawijaya, Indonesia)	Phytochemical Strategy Against Plasmodium: A Functional Ethanol Extract from Canna indica
12.20 – 12.25	Discussion	
12.25 – 13.20	Lunch Break	

Room 2 (MC Lt. 5 Ruang Sidang) Moderator: Jira Fourindah Deskartesy Huma, S.Si., M.Sc.		
Time	Presenter	Title
08.00 – 08.15	Kinuko Uno, Ph.D (Kyoto University, Japan)	Interaction of dextran sodium sulfate-induced colitis and diet-induced MASLD in mice
08.15 – 08.30	Keita Sekiguchi (Kyoto University, Japan)	Exploration of partial epithelial-mesenchymal transition induction in proximal tubular epithelial cells and its relation to fibrosis of the renal stroma in rats on a high phosphorus diet.
08.30 – 08.45	Dr. rer. nat. apt. Sri Mulyaningsih, M.Si. (Universitas Ahmad Dahlan, Indonesia)	Antibacterial Mechanism of Action of *Poikilospermum suaveolens* (Blume) Merr. Stem Extract on the Cell Membrane of *Staphylococcus epidermidis*
08.45 – 08.50	Discussion	
08.50 – 09.05	dr. Galang Mahasin Muhammad (Universitas Brawijaya, Indonesia)	Mobile-Based Papilledema Detection from Fundus Images Using MobileNet V2: A Deep Learning Approach for Screening Increased Intracranial Pressure
09.05 – 09.20	Dr. dr. Nia Kurnianingsih, M.Biomed (Universitas Brawijaya, Indonesia)	Anthocyanin Extract from Indonesian Purple Sweet Potatoes Influences Behavior and Brain Function in a Stress-Exposed Animal Model
09.20 – 09.35	Dr. apt. Hari Susanti, M.Si. (Universitas Ahmad Dahlan, Indonesia)	The Total Phenolic Content and Antioxidant Activity of Coffee Leaves and Coffee Bean Extract
09.35 – 09.40	Discussion	

09.40 – 09.55	Amelia Anggraeni Pramono, S.Si (Universitas Brawijaya, Indonesia)	Study on the Purification and Bioconversion of Proinsulin Glargine for Production of Recombinant Insulin Glargine Using Pichia pastoris
09.55 – 10.10	Jira Fourindah Deskartesy Huma, S.Si., M.Sc. (Universitas Brawijaya, Indonesia)	Enhancing Bispecific Antibody-Based Immunotherapy for Pancreatic Cancer via 4-1BB/4-1BBL Co-Stimulation: A Targeted Molecular Strategy from Tumor Microenvironment Insights
10.10 – 10.25	Mely Yuliana, S.Pd., M.Si (Universitas Brawijaya, Indonesia)	Virtual prediction of β-Glucogallin from Malacca fruit (*Phyllanthus emblica*) as an antihypertensive targeting ACE and AT1R in Chronic Kidney Disease
10.25 – 10.30	Discussion	
10.30 – 10.45	dr. Firda Aunidiah Putri (Universitas Brawijaya, Indonesia)	Comparison Clinical Symptom Profile and Outcomes of Tuberculous Meningitis Patients with Anti-Tuberculosis Drugs Induced Liver Injury (At-Dili)
10.45 – 11.00	Mayra Nur Fatikha, S.Si (Universitas Brawijaya, Indonesia)	Transglycosylation Activity of the β-Glucosidase Enzyme from Paenibacillus polymyxa Bacteria on Glycerol Substrate
11.00 – 11.15	Sekararum Narwasthu, M.Si (Universitas Brawijaya, Indonesia)	The Effect of Genistein Compound on the Differentiation and Lipid Accumulation of 3T3-L1 Cells
11.15 – 11.20	Discussion	
11.20 – 11.35	Dwi Listyorini, Ph.D. (Universitas Negeri Malang, Indonesia)	Targeting Breast Cancer Angiogenesis Pathway Using Myricetin from Local Grape Seed Through In-silico Approach
11.35 – 11.50	Anchi Alifia Azzahra Provadika, S.Si. (Universitas Brawijaya, Indonesia)	Microencapsulation of Ethanol Extract of Delonix regia Leaves with The Influence of Sodium Alginate Concentration and Stirring Time and Its Antioxidant Activity Test

11.50 – 12.05	Ja'far Umar, S.Si., M.Si. (Universitas Brawijaya, Indonesia)	Anti-Adipogenic Effects of γ-Oryzanol Extracted from Brown Rice in Hypercholesterolemic Rats
12.05 – 12.10	Discussion	
12.10 – 13.10	Lunch Break	

Room 3 (Online) Moderator: Dr. Ernanin Dyah Wijayanti, S.Si., M.P.		
Time	Presenter	Title
08.00 – 08.15	Prof. Ajaikumar B. Kunnumakkara (IIT-Guwahati,India)	Exploring the therapeutic promise of mortalin: a novel target against cancers prevalent in Northeast India
08.15 – 08.30	Dr. Kazumi Hirano (AIST, Japan)	Fucoxanthin present in brown seaweeds has potential to treat protein-aggregation related pathologies
08.30 – 08.45	Dr. Myat Nyein Khine (AIST, Japan)	Smart Probes of Saponin for Its Efficient Target Identification and Mechanistic Studies
08.45 – 08.50	Discussion	
08.50 – 09.05	Zhang Huayue (SIBPT, China)	Three antistress compounds, triethylene glycol, Withanone, and Withaferin A possess cancer preventive and therapeutic potential
09.05 – 09.20	Diah Sudiarti, S.Pd., M.Si (Universitas Jember, Indonesia)	Photosynthetic Response of Black Glutinous Rice (*Oryza sativa* var. *glutinosa*) to PEG-induced Drought Stress
09.20 – 09.35	Regina Putri Virgirinia, S.Si., M.Sc., D.Sc. (Universitas Brawijaya, Indonesia)	Chemical Profile and Erosive Potential of Kombucha Derived from Black, Green and Butterfly Pea Tea
09.35 – 09.40	Discussion	
09.40 – 09.55	Nikman Azmin (Universitas Brawijaya, Indonesia)	Phytochemical Characteristics of Sargassum Seaweed in Various Marine Waters of Bima District, West Nusa Tenggara

09.55 – 10.10	Cynthia Putri Yuwana (Universitas Indonesia, Indonesia)	Metabolite Profile and Antioxidant Activity of *Muntingia calabura* Leaf Extract
10.10 – 10.25	Paulix Tuther (Universitas Sam Ratulangi, Indonesia)	Potential Compound Candidate from Nutmeg Leaves (*Myristica fragrans)* On Antiaging Target as a Cosmetic Innovation with an In-Silico Approach
10.25 – 10.30	Discussion	
10.30 – 10.45	Aryatama Adi Krisna (Universitas Pembangunan Nasional "Veteran" Yogyakarta)	The reducing pH of red mud using *Citrus aurantiifolia* swingle at ambient temperature
10.45 – 11.00	Galuh Wening Permatasari M.Eng (IOPRI, Indonesia)	Targeting Inflammation and Oxidative Stress: In Silico Profiling of Bioactive Compounds from Biotransformed Oil Palm Leaves
11.00 – 11.15	Fadita Nurul Aini (Universitas Indonesia, Indonesia)	Phytochemical Characterization and Antioxidant Potential of Artemisia vulgaris from Indonesia
11.15 – 11.20	Discussion	
11.20 – 11.35	Muhammad Ilhan Mansiz (Universitas Pembangunan Nasional "Veteran" Yogyakarta)	Improving the viscosity of Ca-bentonite mud with aloe vera leave as thickener agent
11.35 – 11.50	Hidayah Murtiyaningsih, S.Si., M.Si (Universitas Jember, Indonesia)	CRISPR/Cas9-Mediated Mutagenesis of *Non-dormant Axillary Bud 1*(*SbNAB1*) Genes in Sorghum Alters Strigolactone Biosynthesis
11.50 – 12.05	Dr. apt. Dika Pramita Destiani, M.Farm (Universitas Padjajaran, Indonesia)	AMPD1 and MTHFR genes are not associated with calcium levels in rheumatoid arthritis patients with methotrexate therapy in Indonesia
12.05 – 12.10	Discussion	
12.10 – 13.10	Lunch Break	

13.10 – 13.15 Participants from Room 2 and Room 3 move to Room 1

13.15 – 13.25 Awarding for Best Presenter

13.25 – 13.35 Closing speech

Keynote Speaker 1

Investigation of Optimal Conditions for Short-term Experiments and Associated Changes in Inflammatory Parameters in Dextran Sulphate Sodium (DSS) Induced Colitis Model Mice

Katsuhiro Miyajima

Faculty of Applied Biosciences, Tokyo University of Agriculture

Inflammatory bowel disease is a serious problem caused by chronic inflammation of the intestinal tract, and the causes of this phenomenon are not fully understood. To explore the mechanisms of the disease, animal models with a stable lesion with a short experimental period are needed. Although the DSS (dextran sulphate sodium salt) induced colitis model is widely used, the severity and incidence of the induced disease varies depending on conditions such as DSS concentration, duration and rearing environment. In this study, we investigated the inflammatory factors by examining appropriate concentrations and duration. In addition, the inflammatory profile was examined between histopathological findings and gene expression. Seven-week-old male C57BL/6j mice were given DSS (MP Biomedicals, LCC) at 1.25%, 2.5% for 2 weeks and 5% for 1 week in the drinking water. Some mice at 2.5% DSS showed severe symptoms or died, while others had no colonic lesions. In the 5% DSS group, a stable effect on intestinal lesions and elevated inflammation-related parameters was observed from day 3, and obvious inflammatory findings were observed in the colon of all animals on day 7. Gene expression analysis revealed a significant increase in TNF-alpha and IL-1beta at 3 days, followed by a decrease at 7 days. However, MIP-2 and MRP8 increased significantly from day 3 and continued to increase until day 7. These results suggest that 5% DSS in drinking water causes stable lesions and increases inflammation. This presentation will also focus on animal models of autoimmune diseases such as atopic dermatitis. Atopic dermatitis is a type 2 inflammatory skin disease and Th2-type allergic reactions are known to be involved in its pathogenesis. We analysed a model of hapten-induced contact dermatitis by topical application of DNFB to the earlobe in mice. Histopathology revealed dermal thickening, stasis and mast cell degranulation in the earlobes of DNFB-treated mice.

Keynote Speaker 2

Molecular Link Between Stress and Cancer: Interventions with Small Molecules

Renu Wadhwa[1], Yoshiyuki Ishida[2], Keiji Terao[2] and Sunil C. Kaul[1]

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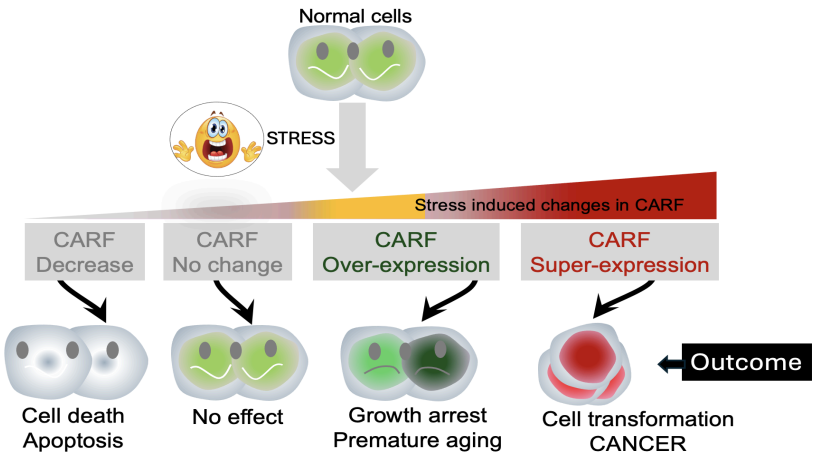
Human quality of life is profoundly affected by a rapidly changing environment and increasing stress. Research focused on understanding and intervening in stress, its link to lethal pathologies, and the discovery and development of nutraceutical and pharmaceutical small smart molecules is highly desired. Living cells in culture respond to stress by exhibiting altered morphology and underlying molecular signaling pathways, and can serve as a valuable tool for the discovery and development of small molecules for intervention. We initially performed a two-hybrid screening to identify binding partners of the tumor suppressor/stress response protein ARF. This led us to clone a new protein (named CARF for Collaborator of ARF). An extensive analysis of CARF levels in cells exposed to various stresses, including physiological, environmental, oxidative, radiation, and chemotherapeutic agents, was performed using a combination of biochemical, molecular, and imaging assays in an in vitro cell system. Using ARF as bait in a two-hybrid functional screening system, we first cloned its new binding partner, which we named CARF. Molecular analyses demonstrated that CARF is an essential protein. CARF-compromised cells underwent apoptosis *in vitro* and showed strong growth suppression in *in vivo* tumor xenograft mouse models. Interestingly, CARF was upregulated in response to various extrinsic and intrinsic stresses. To validate these findings, we generated cells with serially increasing expression of CARF. We found that while its overexpre ssion caused growth arrest and premature aging, its superexpression led to malignant transformation. Extensive molecular analyses demonstrated (i) the bridging role of CARF in



stress, aging, and cancer phenotypes, (ii) its application in pharmaceuticals and nutraceuticals as a diagnostic and prognostic marker for chronic stress and age-related pathologies, and (iii) its intervention with natural compounds, including ingredients from Ashwagandha, honeybee propolis, soya, wakame seaweed, and cyclodextrins. CARF acts as an indicator for developing small molecules to treat stress and disease.

Keywords: Environmental stress, aging, cancer, intervention, CARF, natural compounds.

Keynote Speaker 3

Innovative Drug Delivery: Development of Lipid-Based Niosomes containing *Brucea Javanica* for Diabetes Treatment

Noraini Ahmad

Nanotechnology is reshaping the landscape of drug formulation and targeted delivery, offering new strategies for managing chronic diseases such as type 2 diabetes. This study focuses on the development and characterization of lipid-based nanocarriers specifically niosomes, encapsulating *Brucea Javanica* (BJ) extract, a traditional medicinal plant with known antidiabetic potential. Niosomes were prepared via a modified ethanol injection method using various Tween nonionic surfactants in combination with glycolipids. The formulations were systematically characterized for particle size, morphology, encapsulation efficiency (EE%), stability, and in vitro release behaviour. The optimized niosomes demonstrated favourable physicochemical properties, with particle sizes ranging from 150–200 nm, low polydispersity indices (0.073–0.189), and high encapsulation efficiency, particularly when Tween 20 was used as a co-surfactant. Transmission electron microscopy confirmed a uniform, spherical morphology, while stability studies showed minimal aggregation and consistent particle size over time. *In vitro* release studies demonstrated a sustained drug release profile, suggesting enhanced bioavailability of the encapsulated BJ extract. These results underscore the potential of BJ-loaded niosomes as a promising nanocarrier system for type 2 diabetes therapy. Moreover, the study highlights how nanotechnology can enhance the delivery and therapeutic efficacy of traditional medicinal extracts, bridging the gap between ancient remedies and modern pharmaceutical science. Future research, including *in vivo* studies and clinical trials, is essential to fully understand the pharmacokinetics and therapeutic impact of this formulation. This innovative approach could ultimately contribute to more effective diabetes management and broaden the range of available treatment options.

Keywords: Alkyl glucoside; Self-Assembly; Niosome; Brucea javanica; Diabetes

Keynote Speaker 4

Severinia buxifolia-isolated acridones inhibit lung cancer invasion and decrease HIFα protein synthesis involves 5'UTR-mediated translation inhibition

Hui-Chun Wang

Graduate Institute of Natural Products, Kaohsiung Medical University, Taiwan

Lung cancer is one of the most common cancers worldwide and is by far the leading cause of cancer death attributed to its rapid metastasis and poor prognosis. Given that hypoxia-inducible factors (HIFs) are associated with cancer metastasis, discovering agents to inhibit HIF-mediated invasive cancer is highly desired. This study aimed to investigate the natural acridone compounds isolated from *Severinia buxifolia* for the potential to delay hypoxia-induced lung cancer invasiveness by HIF inhibition. Using a hypoxia-responsive element (HRE) luciferase reporter, cell migration and invasion assays, real-time PCR, Western blot, and DNA recombinant clones, compound effect on HIF activity, cancer metastasis, HIF-1α mRNA transcription, HIFs protein stability, and HIF-1α translation were observed under hypoxia conditions. Atalaphyllidine (Sbs-A) and atalaphyllinine (Sbs-B) were found to show the most potent effects on HIF transcriptional activity and HIF-1α protein expression in NSCLC cell line A549, although Sbs-A and Sbs-B might not attribute decreasing HIF-1α mRNA expression to potent inhibition of HIF activity. HIF-1α protein stability was not affected by Sbs-A; also, prolyl hydroxylase and proteasome inhibitors could not reverse the inhibitory effect from compounds. Furthermore, 3-10 μM low concentrations of Sbs-A inhibited HIF target gene expression, gelatin zymography activity, and A549 cancer invasion. Ultimately, Sbs-A inhibited HIF-1α 5'UTR-mediated translation independent of oxygen concentration, underlying the mechanism of compounds inhibiting HIF-1α protein expression. Our study proposed *S. buxifolia*-isolated acridone compounds inhibited 5'-mRNA HIFA-mediated translation and provided evidence supporting the ability of acridone compounds in targeting HIFα for delayed lung cancer metastasis.

Plenary Speaker 1

Utilization of Fish Scale Waste as Raw Material for Nutraceuticals: An Innovative Solution for Arthritis Patients

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Degenerative joint diseases, such as osteoarthritis (OA) and rheumatoid arthritis (RA), significantly impair mobility and quality of life, especially among aging populations. Current therapeutic strategies, including non-steroidal anti-inflammatory drugs (NSAIDs), intra-articular injections, and joint replacement surgeries, often involve side effects or limited accessibility. Nutraceutical approaches using bioactive peptides offer a promising alternative. This study explores the potential of fish protein hydrolysate (FPH), derived from Lemuru (sardine) fish scales, as a functional nutraceutical with antioxidant activity. Enzymatic hydrolysis using food-grade papain and bromelain was employed to produce hydrolysates with varying molecular weights, also antioxidant and antiinflammation. Response Surface Methodology (RSM) showed optimal processing parameters for maximizing antioxidant activity. These findings support the valorization of fish processing waste and highlight the potential application of FPH in the prevention or management of degenerative joint diseases.

Plenary Speaker 2

Hormesis, Wellness And Nano Bubble Technology

Sutiman Bambang Sumitro

Hormesis is a biological phenomenon where exposure to a low dose of gasotransmitters have a beneficial, adaptive effect, while a higher dose of the same substance or condition can be harmful. It's essentially a biphasic dose-response, meaning the effect reverses at different concentrations. Understanding hormesis is important in various fields, including degenerative and even our understanding of aging and longevity. The concept of hormesis is also relate with wellness that a little bit of stress can stimulate adaptive responses that improve overall health and performance. The exercise of the body has relation with maintaining hormetic zone, which is an ability of the body to have dynamic maintanence of gasotransmitter at low dose, can be beneficial for overall health. Nanobubble technology utilizes extremely small hydrophobic gas bubbles, typically less than 200 nanometers in diameter, can be use to support hormesis. These nanobubbles, due to their size and properties, can remain suspended in water for extended periods, enabling them physiological dissolved gas to support hormetic system important for health and wellness.

Plenary Speaker 3

Development of New Drug Discoveries from Natural Resources through Ethnomedicine Studies

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Ethnomedicine is the study of local people's perceptions and conceptions in understanding health or the study of traditional tribal medicine systems. This study is used to trace the discovery of new medicinal plants for certain therapies. Until now, the Dayak Tribe, one of the tribes in Kalimantan, still uses traditional treatment methods that are carried out from generation to generation by utilizing natural ingredients such as plants. One of which is yellow root (*Arcangelisia flava* (L.) Merr.) to relieve joint pain. Osteoarthritis is a joint pain disease with a high global prevalence. This disease occurs due to an imbalance in chondrocyte cells that produce proteoglycans and collagen in cartilage, leading to increased production of pro-inflammatory cytokines. Interleukin-1β (IL-1β) is a key pro-inflammatory cytokine involved in the pathophysiology of osteoarthritis because it increases the synthesis of MMP and ADAMTs. The yellow root extract contains alkaloids (berberine, palmatine, and jatrorrhizine), flavonoids, and saponins, which, based on in silico studies, had functioned as anti-inflammatories by inhibiting iNOS, and in vivo studies reduced COX-2 expression. Another study showed that this extract reduced IL-1β levels in osteoarthritis rat models induced with MIA. This plant has been tested orally and proven to reduce IL-1β levels. Due to the weaknesses of oral herbal medicine, such as first-pass metabolism and issues with acceptability and effectiveness, a topical gel formulation of 70% extract of yellow root stem was developed. Then, this gel met the required standards for characteristics evaluation based on organoleptic properties, pH, homogeneity, viscosity, stability, and spreadability. This gel at 2.5%, 5%, and 10%, also reduced IL-1β levels in the osteoarthritis rat model. So the yellow root, which was initially obtained from an ethnomedicine study, has the potential to be developed as an anti-osteoarthritis product.

Keywords: Ethnomedicine, Osteoarthritis, *Arcangelisia flava* (L.) Merr, Gel, IL-1β, *in viv*

Plenary Speaker 4

Development of Novel Natural Therapeutic Anticancer Agents Based on Native Plant Bioactive Compounds

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Exploring natural therapeutic agents containing diverse native plant compounds for new anticancer and anti-inflammatory agents has become a major concern in pharmaceutical research. Cancer remains one of the deadliest diseases in the world. The alarming increase in the mortality rate due to this disease has drawn attention to the discovery of potent anticancer agents to overcome it. The anticancer agents from natural sources have become a major focus in pharmaceutical research due to the attractive natural therapeutic agents with great chemical diversity in various organisms, especially local plants in the wild and cultivated. A modern and intelligent bioinformatics approach for precise drug discovery is to study anticancer compounds derived from native Indonesian medicinal plants from various databases, based on plant types, bioactive compounds, and their properties. The screening obtained from these anticancer compounds is analyzed for biological function, pathways in cancer occurrence, and related gene cascades and metastasis mechanisms. Plants in Indonesia that have been widely explored as anticancer agents are the Zingiberaceae and Clusiaceae families. In addition, anticancer compounds are also found in *Litsea cubeba* Lour, *Cyperus rotundus*, Begonia sp., and *Clitoria ternatea*. The plant varieties' compounds have been identified, including flavonoids, terpenoids, phenolics, and other organic compounds. The bioactive compounds of plant species with the lowest IC50, which is the concentration required to inhibit 50% of cancer growth, were found in breast cancer at 26.3%, cervical cancer at 15.3%, liver cancer at 14.2%, colorectal cancer at 13.1%, lung cancer at 12.1%, leukemia, lymphoma, melanoma, pancreatic and prostate cancer. Thymoquinone, kaempferol, eugenol, catechin, brasilin, and apigenin are non-toxic bioactive compounds that properly prevent the mechanism of cancer disease pathways without violating bioactivity. These compounds work synergistically with chemotherapy drugs to

increase drug efficiency with minimal side effects. The conclusion is that different medicinal plants have their anti-cancerous potential. Plant-derived compounds may not be directly used as drugs, but they encourage researchers to design and develop new anticancer agents. A thorough understanding of the mechanism of action of plant-derived bioactive compounds with anticancer properties is fundamentally necessary for cancer treatment, which provides a better quality of life for cancer patients.

Keywords: cancer, native bioactive compounds, natural plant sources, pharmaceutical discovery, therapeutic agents

Online Presentation 1 (Room 1)

Cyclodextrin empowered small molecules from Propolis, Ashwagandha, and Cinnamon for managing stress and cancer: experimental evidence

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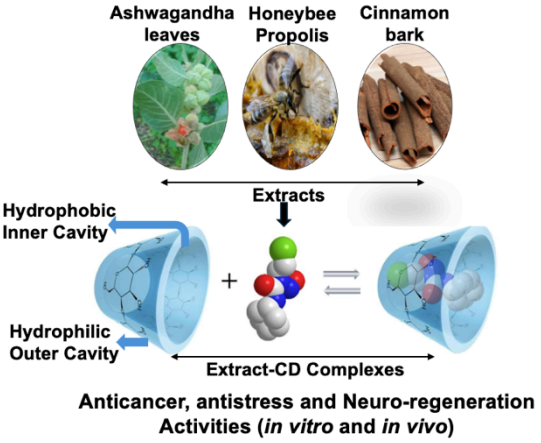
Cyclodextrins (CDs) are oligosaccharides with a cyclic structure composed of 6, 7, and 8 (for α-CD, β-CD, and γ-CD, respectively) glucopyranose units. They possess a unique structure with a hydrophobic inner cavity and a hydrophilic surface that permits encapsulation of hydrophobic small molecules and improves their stability and solubility in *in vitro* and *in vivo* systems. We generated cyclodextrin complexes of crude extracts/purified ingredients from Honeybee propolis, Ashwagandha leaf, and Cinnamon. Antistress, antiaging, anticancer, and neuro-regenerative activities of these complexes were examined by *in vitro* and *in vivo* assay systems. Molecular mechanisms of their action were determined by evaluating the expression of marker proteins using specific antibodies. We initially found that whereas Caffeic acid phenethyl ester (CAPE), a bioactive ingredient from Honeybee propolis, is unstable, its complex with γ-CD was stable and showed enhanced bioactivities, including anticancer and antistress in cell-based assays. *In vivo* tumor progression assays revealed stronger tumor suppression by CAPE-γCD complex than CAPE alone. CAPE offered significant anti-stress activities and neurodifferentiation potential *in vitro* at low nontoxic doses. Of note, it caused improvement in (i) neuromuscular activity in the fruit fly model of Alzheimer's disease, and (ii) cognitive and memory function in the mouse model of memory loss; CAPE-γCD complex showed better effect in the latter, as supported by behavioral and molecular analyses. Cyclodextrin-assisted Ashwagandha leaf extracts were seen to possess higher content of anti-cancer withanolides, as validated by analytical, cell-based *in*



vitro, and *in vivo* assays. Most recently, we generated Cyclodextrin-assisted aqueous extract of cinnamon that was seen to offer anticancer and antistress activities comparable to its DMSO extract, offering a new economic and easy cinnamon-based nutra-/pharmaceutical resource. Studies support the use of cyclodextrins not only as a pharmaceutical ingredient that enhances therapeutic outcomes but also as a NEW (Natural, Economic and Well-being promoting) nutraceutical component that improves Quality of Life in several ways

Online Presentation 2 (Room 1)

Identification and validation of antistress activities of Alpha Lipoic Acid: relevance to healthy aging

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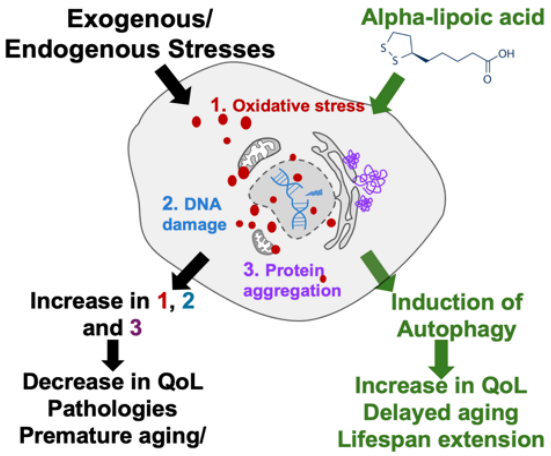

Stress is widely recognized as an unavoidable part of life. It is linked to various metabolic and chronic illnesses, and even fatal diseases like cancer. A variety of endogenous and exogenous stresses have been associated with poor quality of life due to metabolic disorders, cognitive impairment, and accelerated aging. The accumulation of molecular waste resulting from oxidative and heavy metal-induced stress has been implicated as a major cause of these diseases. While drug development and disease therapeutics have progressed significantly in recent decades, options for stress management remain limited. Human cells in culture demonstrate a response to various stresses and provide a dependable method for screening antistress compounds and exploring their molecular mechanisms of action. Considering that oxidative, metal, and hypoxia are the primary stress types related to chronic diseases and aging, we developed a three-way screening system for identifying and validating antistress compounds. Thirteen small molecules were examined for their antistress activity in a three-way antistress screening assay using C6 glioblastoma. IC50 and IC25 doses of stress were established. Cells exposed to an IC20 dose of stress were recovered in the presence of test compounds to identify those leading to better recovery. Alpha-lipoic acid (ALA), a naturally occurring antioxidant found in yeast, spinach, broccoli, and meat, was selected as an effective antistress candidate. Synthesized de novo in mitochondria from an eight-carbon fatty acid (octanoic acid) through enzymatic reactions involving lipoyl transferase 2, lipoyl synthase, lipoyl transferase 1, and dihydrolipoamide

dehydrogenase, it is reduced to dihydrolipoic acid (DHLA). A potent thiol antioxidant found in all cell types, it has multiple physiological functions. Cells exposed to heavy metals, heat, and oxidative stress exhibited enhanced recovery when cultured in ALA-supplemented medium, as evidenced by (i) a reduction in molecular markers of oxidative stress, protein aggregation, mitochondrial damage, and apoptosis, (ii) the induction of autophagy, and (iii) the extension of lifespan in normal human fibroblasts. Next, we conducted transcriptomic and in vitro analyses of control and ALA-treated cells, finding significant upregulation of genes associated with neurogenesis, axonogenesis, gliogenesis, and dendrite morphogenesis. Experiments using rat and human brain-derived cells demonstrated morphological changes indicative of neurodifferentiation in ALA-treated cells, further validated by the upregulation of proteins involved in neuronal differentiation. The data supports Alpha-lipoic acid (ALA) as a natural neurogenic compound with potential therapeutic applications for age-related neurodegenerative diseases.

Online Presentation 3 (Room 1)

Wi-A and CAPE Combination for Cancer and COVID-19 Management??

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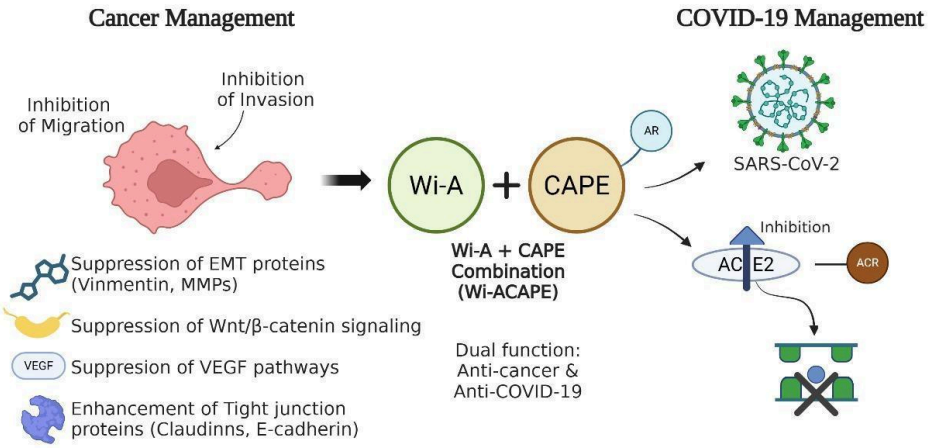
Natural compounds such as Withaferin A (Wi-A) and Caffeic Acid Phenethyl Ester (CAPE), derived from *Withania somnifera* and honeybee propolis respectively, are known for their anticancer and anti-inflammatory properties. Recent studies suggest their potential against both cancer progression and SARS-CoV-2 infection. In this study, we evaluated the efficacy of the Wi-A and CAPE combination (Wi-ACAPE) in inhibiting cancer metastasis and SARS-CoV-2 infection through in vitro and computational approaches. The anticancer activity was assessed in various human cancer cell lines including HeLa and MDA-MB-231 through cell migration, invasion, angiogenesis, gene expression, and protein profiling assays. Anti-COVID-19 activity was evaluated using molecular docking, molecular dynamics simulations, RT-qPCR, and viral infection assays, targeting androgen receptor (AR), ACE2, and TMPRSS2 pathways. Wi-ACAPE showed significant inhibition of cancer cell migration, invasion, and angiogenesis. Mechanistically, this was linked to suppression of EMT-associated proteins (Vimentin, MMPs), Wnt/β-catenin signaling, and VEGF pathways, while enhancing tight junction proteins (Claudins, E-cadherin). For COVID-19, CAPE exhibited AR antagonistic activity, and both Wi-A and CAPE demonstrated strong binding to ACE2 and TMPRSS2. Their combination resulted in downregulation of ACE2 and TMPRSS2 and significantly reduced



SARS-CoV-2 infection in vitro. The combination of Wi-A and CAPE (Wi-ACAPE) exhibits dual functionality—anticancer and antiviral—by targeting metastasis-associated pathways and host receptors crucial for SARS-CoV-2 entry. This supports its potential as a natural, multi-target therapeutic candidate for managing cancer and COVID-19, warranting further preclinical and clinical investigation.

Invited Speaker 1 (Room 1)

Targeted Drug Delivery Through Microencapsulation of Plant Extracts: Design, Characteristics, and Biological Efficacy

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Over the years, there has been growing interest in researching herbal plants as alternatives to synthetic drugs. Herbal plants, which are often more accessible and associated with fewer side effects than synthetic medications, contain bioactive compounds that are believed to help prevent and treat diseases [1], [2]. Microencapsulation offers a promising approach to enhance the stability and protect these compounds from environmental stressors [3]. In this study, Response Surface Methodology (RSM) was employed to optimize the microencapsulation parameters of *Tithonia diversifolia* extract using sodium alginate as the encapsulating agent and freeze-drying as the encapsulation technique. A Central Composite Design (CCD) was applied using Design Expert software (version 13), with coating concentration (X_1) and stirring time (X_2) as independent variables, and encapsulation efficiency (Y) as the response. The results indicated that both variables had a significant effect on encapsulation efficiency. The optimal conditions, 2% (w/v) sodium alginate and 75 min of stirring, yielded an encapsulation efficiency of 55.89%. The antioxidant activity of the resulting microcapsules was evaluated via DPPH assay, showing an IC_{50} value of 104.944 ± 0.98 µg/mL. Fourier-transform infrared (FTIR) spectroscopy confirmed the presence of characteristic functional groups (OH, CH, C=C–C, and C–O–C), indicating successful encapsulation. Scanning Electron Microscopy (SEM) analysis revealed microcapsules with irregular, wrinkled surfaces and scattered spherical morphologies ranging from 1.64 to 3.94 µm in size. **Conclusion**. Overall, this study demonstrates that RSM is an effective tool for optimizing microencapsulation parameters and provides valuable insights into the physicochemical and functional properties of *T. diversifolia* microcapsules, highlighting their potential for application in functional materials and nutraceutical delivery systems

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Oral Presentation 4 (Room 1)

Mechanisms of Functionalized Azo-Azomethine as Anti-Amoebic Compound and Its Reaction on Human Serum Albumin for Drug Development and Safety Screening

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Hassan Rabi'a Muhammad[3], Muhammad Syahmi Zaharuddin[3],
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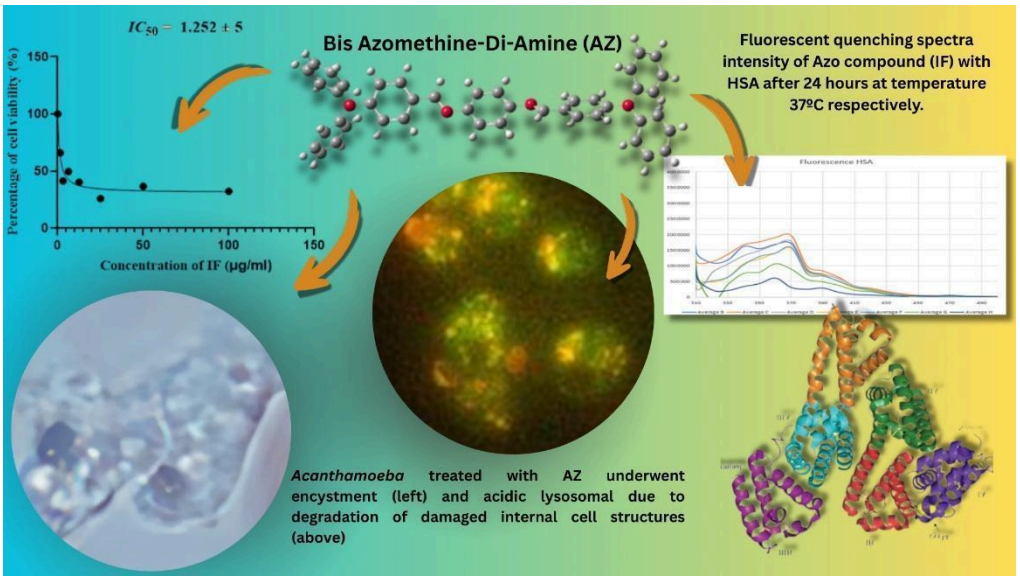
Herein, hybrid moieties of well-known conjugated π-systems; azo (-N=N-) and azomethine (-CH=N-) units, have been successfully synthesized, characterized and applied as new anti-amoebic compounds against *Acanthamoeba* sp. This **AZ** derivative involving the 'Donor-π-Acceptor' concept was synthesized via an aerobic approach of the azo coupling process and amine condensation reactions. The structures of **AZ** compound have been characterised through IR, UV–vis, ^{1}H and ^{13}C NMR spectroscopic techniques. The derivative was assessed for its cytotoxicity potential based on dose-response analysis, morphological observation, and mode of cell death assessment on *Acanthamoeba* sp. In addition, the binding interaction of azo with protein was evaluated using human serum albumin (HSA) binding studies. The optical band gaps (E_g^{opt}) of **AZ** exhibited a low HOMO-LUMO gap at 2.17 eV, corresponding to higher amoebic activity. TD-DFT computations for frontier molecular orbitals (FMO) and molecular electrostatic potential (MEP) maps were also used to emphasized the structure-property relationship of anti-amoebic activity synthesized compound against *Acanthamoeba* sp. From IC_{50} findings, functionalized alkoxylated azo-azomethine revealed the growth inhibition of *Acanthamoeba* sp. with IC_{50} values at 1.252μg/ml. The compound exhibited moderate efficacy in inhibiting amoebic growth, suggesting its viability as an alternative treatment

option. HSA binding studies revealed that the absorption peak at 290 nm increased rapidly with higher azo concentrations, suggesting the formation of a complex between azo and the protein. These characteristics, combined with the compound's positive and active nature in HSA binding, supported its therapeutic potential for anti-amoebic agents. This study advances the recognition of the new therapeutic strategies for *Acanthamoeba* infections and, firstly explores the protein-ligand interaction data to emphasize the value of multiple safety assessments for drug research.



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Invited Speaker 2

Identifying Biosynthetic Hotspots of Natural Products to Guide Conservation of Medicinal Resources

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Natural products (NPs) are indispensable for human health, yet their supply is increasingly endangered by biodiversity loss and ecosystem degradation. To strategically guide conservation efforts, it is crucial to pinpoint geographic regions rich in NP potential. We performed a genome-informed spatial analysis by compiling genomic and transcriptomic data for 1,434 woody angiosperms from public databases. After quality filtering using BUSCO, we annotated 166 enzymes involved in NP biosynthesis, spanning key families such as CYPs, UGTs, OMTs, and TPS. Species distributions were modeled with Maxent at 110 km grid resolution using environmental predictors. NP richness was estimated by averaging enzyme marker presence across grids, and marker-specific distributions were further analyzed to detect spatial heterogeneity. Biodiversity and NP enzyme richness were highest in equatorial regions. While most of the 166 enzyme markers showed broad global distribution, several—including UGT82A1, DOXC20, PTpat, and UGT83A1—exhibited high spatial heterogeneity, indicating localized biosynthetic potential. Some of these enzymes are linked

to bioactive compounds with antioxidant or anti-inflammatory properties. Targeted analysis revealed that enzymes for shikonin biosynthesis were geographically restricted to East Asia and the Himalayas, whereas benzylisoquinoline alkaloid enzymes were more widely distributed. These patterns highlight both general and region-specific trends in NP biosynthesis, supporting the need for conservation strategies that account for both species and functional biochemical diversity. Our analysis demonstrates that regions abundant in these enzyme markers generally coincide with recognized biodiversity hotspots. However, certain enzymes—such as those involved in shikonin derivative biosynthesis—exhibit distinct spatial patterns, indicating the need for more focused conservation strategies.

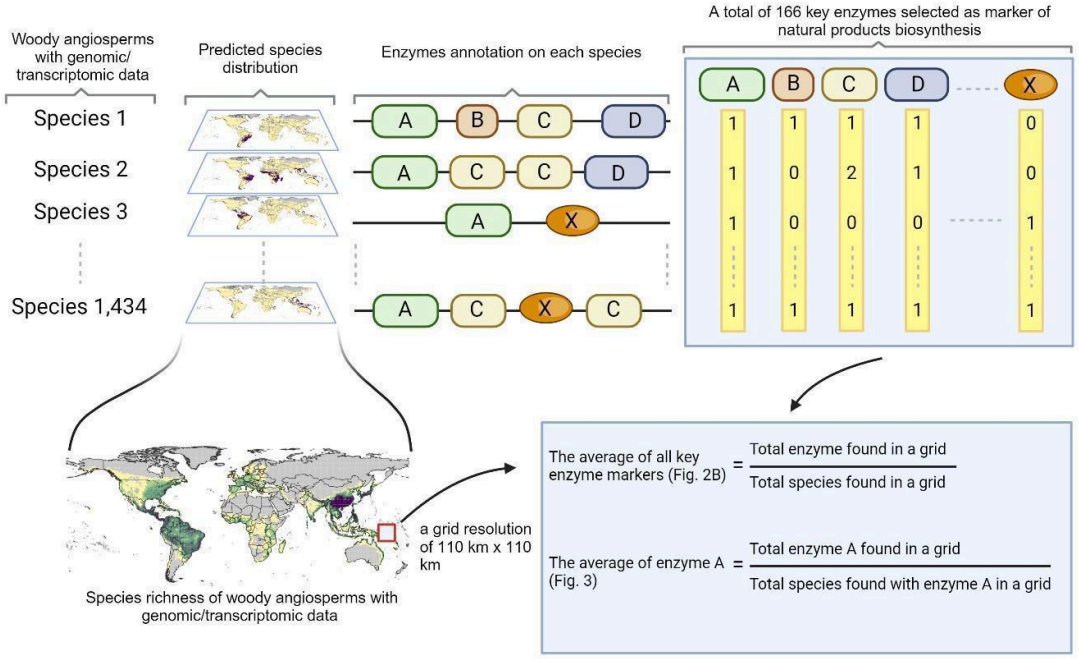

Illustration of genomic-driven, geospatial analysis. The process starts with the identification of woody angiosperm with genome or transcriptome data available in public databases and their predicted distribution on global maps. Each species is annotated with curated 166 key enzymes selected as markers for natural products biosynthesis. The lower part of the figure presents the species richness of woody angiosperms based on the genomic- transcriptomic data across a global map, with a 110 × 110 km grid cell. The calculations detail the average of enzyme markers and the proportion of specific enzymes found within the grid regions.

Oral Presentation 5 (Room 1)

Integrated Bibliometric Analysis of Herbal Neuroprotection Research (2010–2025): From Oxidative Stress to Molecular and Glial Mechanisms

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Neurodegenerative diseases, including Alzheimer's disease, are among the leading causes of disability worldwide. Natural compounds and herbal bioactives have attracted increasing attention as promising neuroprotective agents targeting oxidative stress, neuroinflammation, and mitochondrial dysfunction. This study aimed to deliver an integrated bibliometric analysis of global research trends, dominant molecular pathways, and emerging hotspots in the field of herbal neuroprotection. We combined analyses from two complementary Scopus datasets: (1) herbal neuroprotection themes, and (2) herbal bioactives with molecular mechanism focus. Data were retrieved from Scopus (2010–2025) using two Boolean strings designed to capture (a) herbal neuroprotection and (b) bioactive-specific molecular mechanisms (involving gene expression, NF-κB, PI3K/Akt, BDNF, synaptic plasticity). Bibliometric maps were created separately for each dataset using VOSviewer (v1.6.20), generating co-occurrence network, overlay, and density visualizations. The datasets were interpreted in an integrated manner to provide comprehensive insight. Six major clusters were revealed in both datasets. The integration highlights oxidative stress, neuroprotection, polyphenols, apoptosis, NF-κB, PI3K/Akt, BDNF, and sirtuins as dominant themes. Emerging topics such as mitophagy, ferroptosis, curcumin, resveratrol, and anthocyanins were mapped as recent hotspots (2019–2024). Microglia and astrocytes were identified as relevant nodes, reflecting the growing interest in glial mechanisms across neurodegenerative and neuropsychiatric research. Publication trends show exponential growth post-2020, peaking in 2024. Top contributing countries were China, India, and the USA, with leading authors including Zengin G., Sahebkar A., and Samarghandian S.

The field is shifting from generic antioxidant studies toward pathway-targeted, translational research with opportunities for integrative lab-based validation. This integrated bibliometric study identifies a clear transition from traditional antioxidant-focused research toward specific molecular targets (e.g., NF-κB, PI3K/Akt, BDNF) and glial mechanisms in herbal neuroprotection. Curcumin, resveratrol, and anthocyanins stand out as promising bioactives warranting translational investigation. Future studies should prioritize empirical validation using animal or cell-based models to accelerate the translation of herbal neuroprotection research into clinical applications.

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Oral Presentation 6 (Room 1)

Seizure Semiology Profile of Epilepsy Patients at the Outpatient Neurology Clinic of RSSA Malang During June–September 2024

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Epilepsy is a chronic neurological disorder with diverse clinical presentations and etiologies. Understanding the semiology of seizures plays a crucial role in accurate diagnosis and effective management. However, mapping of seizure semiology in Indonesia, especially in regional hospitals like Dr. Saiful Anwar General Hospital (RSSA) in Malang, is still limited. This study aims to describe the seizure types and demographic profiles of epilepsy patients attending the outpatient neurology clinic at RSSA from June to September 2024. This was a descriptive observational study using secondary data from electronic medical records (SIMRS). It was done using total sampling that included all diagnosed epilepsy patients who met the inclusion criteria. Data were collected on seizure type (based on ILAE 2017 classification), age, gender, education level, employment status, and seizure-free duration. Data were analyzed using descriptive statistics (frequency, mean, and standard deviation). A total of 120 patients were included in this study. Focal seizures were the most frequently observed type, followed by generalized motor and non-motor seizures. The patient population had a wide age range, with a slight male predominance. Most patients had achieved seizure-free periods ranging from several weeks to over a year. Educational level and employment status showed variability, with a notable proportion having secondary education and being unemployed. These findings align with the patterns observed in other developing regions and highlight the need for individualized treatment approaches based on seizure type and sociodemographic factors. The mapping of seizure semiology in this study provides valuable insight into epilepsy characteristics in a regional setting in Indonesia. It shows the importance of local epidemiological data to support clinician decision-making and optimize epilepsy care.

Oral Presentation 7 (Room 1)

Virtual Screening and Molecular Interaction of Kratom (*Mitragyna speciosa*) as a Drug Candidate for Parkinson's Disease

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Kratom (*Mitragyna speciosa*) is a plant native from Kalimantan island that has traditionally been used for pain relief and treatment for individuals suffering morphine addiction. Recent attention has turned to its potential in addressing neurodegenerative diseases, particularly Parkinson's disease. Parkinson's disease is associated with alpha-synuclein mutations leading to protein aggregation, which causes tremors, rigidity, slow movement (bradykinesia), and an imbalanced posture. This study aims to identify bioactive compounds from kratom with potential therapeutic effects against Parkinson's disease by targeting alpha-synuclein as the molecular interaction site. This study uses a bioinformatics approach, starting with virtual screening of kratom-derived compounds sourced from the literature and the Knapsack Family database. Promising compounds were subjected to molecular docking against alpha-synuclein to assess binding interactions, followed by molecular dynamics simulations to evaluate the stability and binding characteristics of the protein-ligand complexes. The screening results identified Mytragynaline and Corynoxine B as potential candidates, exhibiting binding affinities of -5.9 kcal/mol and -6.7 kcal/mol, respectively, which are stronger than that of the reference drug levodopa (-4.0 kcal/mol). Corynoxine B displayed interaction profiles similar to levodopa, suggesting its promise as a lead compound for further investigation as a potential therapeutic agent for Parkinson's disease.

Oral Presentation 8 (Room 1)

Profile Of Low Back Pain Patients With Pulsed Radiofrequency Therapy At Saiful Anwar Hospital, East Java

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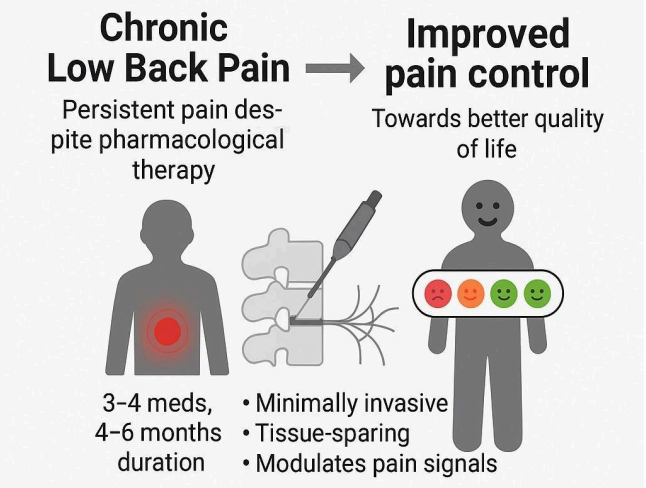
Chronic pain, including *Low Back Pain* (LBP), is one of the major public health problems that has a significant impact on the quality of life of patients and global socioeconomic costs. *Pulsed Radiofrequency* (PRF) therapy is an innovative modality used to manage chronic pain, including LBP, with minimal invasiveness and low risk of tissue damage. This study aims to describe the profile of LBP patients undergoing PRF therapy at Dr. Saiful Anwar Regional Hospital during the period from January to March 2024. This study uses a retrospective descriptive design by analyzing patient medical record data at Dr. Saiful Anwar Regional Hospital in east java. The research population is all LBP patients who underwent PRF therapy from January to March 2024. A total of 30 patients were selected as research samples using purposive sampling techniques according to inclusion and exclusion criteria. Demographic analysis showed that the majority of patients were female (70%), with an age range of 56–65 years (53%). Most patients took 3–4 types of pharmacotherapy (70%) before undergoing PRF, which lasted 4–6 months (37%). A total of 90% of patients underwent the first PRF procedure, while only 10% underwent a second PRF. PRF therapy is an effective modality in managing chronic pain in LBP patients, especially after long-term pharmacotherapy use. These findings provide important insights for developing PRF-based pain management strategies in the future. Further research is needed to evaluate the long-term effectiveness and clinical impact of this therapy in a wider population.



Oral Presentation 9 (Room 1)

Virtual Prediction of Potential Epitopes LNTX Proteins from King Cobra (*Ophiophagus hannah*) Venom for Vaccine-Based Antivenom Development

Wardah Mufidah[1,2], Cahya Ningrum Widiani[1], Arlita Anjani[1], Ilyasya Kustianto[1], Kinanti Nurul Izzah[1], Muhammad Shafala Safa[1,2], Turhadi Turhadi[1], Eko Suyanto[1,2], Fatchiyah Fatchiyah[1,2*]

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The king cobra (*Ophiophagus hannah*) found in South and Southeast Asia including Indonesia, is notorious for being one of the deadliest snake species due to its envenomation snakebite which poses significant public health threats. The most significant factor contributing to its lethality is long chain neurotoxin (LNTX) which is predominant in its neurotoxic venom. Existing antivenoms such as OHMAV and SABU have faced a problem with regional distribution and efficacy. This emphasizes the need for an antivenom that is specific and more effective. This study aims to predict potential epitopes from the LNTX proteins of *O. hannah* venom for antivenom development. The LNTX protein sequence from *O. hannah* venom was retrieved from UniProt and subsequently analyzed for potential epitope prediction. The analysis performed included MHC II and B cell epitopes prediction, conservation, population coverage, and immunogenicity prediction of epitopes using IEDB. AlgPreds were used for allergenicity prediction and for physicochemical characteristic estimations ExPasy were used. Thereafter, epitopes that meets the criteria were modeled in 3D model using PEP-FOLD3 and docked with HLA DRB1*07:01 using HDock web server. The stability of the complexes were verified with molecular dynamics analysis using YASARA v24.4.10. Using the parameters, three potential epitopes were predicted. The selected epitopes are 26-WCDGFCSSRGKRIDL-40, 27-CDGFCSSRGKRIDLG-41, and 25-TWCDGFCSSRGKRID-39. The addition of EAAAK linkers at the N-terminal and C-terminal of the epitopes successfully

facilitated stable interactions with HLA DRB1*07:01. This finding supports the development of a vaccine-based antivenom to immunize against the venom of *O. hannah.*

Keywords: LNTX protein, neurotoxin, king cobra venom, Southeast Asia, Vaccine-based antivenom

Oral Presentation 10 (Room 1)

Production of Maltase-Glucoamylase N-Terminal Catalytic Unit in *Pichia pastoris*

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Diabetes mellitus is a growing global health concern that requires effective therapeutic strategies, including exploring enzymatic targets. Maltase-Glucoamylase (MGAM), an enzyme crucial for breaking down of complex carbohydrates in the intestine, represents a key target for inhibiting glucose absorption. This study aimed to produce and purify the human N-terminal catalytic unit of MGAM (NtMGAM) using *Pichia pastoris*. The pPICZαB plasmid with the human N-terminal MGAM gene was prepared then cut by PmeI, and confirmed by agarose gel electrophoresis. The recombinant plasmid was then transformed into *Pichia pastoris* strains SMD1168H and GS115 by electroporation, with transformed colonies selected on YPD agar containing Zeocin (100 µg/ml and 250 µg/ml). One hundred and fifty colonies were screened in small scale cultures. Following methanol induction over seven days, maltose hydrolysis activity was consistently detected in several *Pichia* clones, notably clones 9, 21, 24, and 70. Multiple purification methodologies were explored. Immobilized Metal Affinity Chromatography (IMAC) showed that the protein did not bind. Instead, DEAE successfully bind with maximal activity found between 250-450 mM NaCl, and corresponding protein bands observed on SDS-PAGE. Due to the remaining impurities, gel filtration chromatography was performed and indicated that the protein could not effectively separated by size. Phenyl sepharose demonstrated activity in both high (1000-500 mM ammonium sulfate) and low (250-0 mM ammonium sulfate) salt fractions. Despite these purification efforts, all protein purification methods still contained impurities. This research confirms the successful production of functional NtMGAM in *Pichia pastoris*, but highlights challenges in achieving high production and purity.

Keywords: Activity, diabates, MGAM, *Pichia pastoris*, protein

Oral Presentation 11 (Room 1)

Pathophysiological analysis of the ear in a mouse model of DNFB (2,4-dinitrofluorobenzene)-induced dermatitis

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Atopic dermatitis is a type 2 inflammatory skin disease and Th2-type allergic reactions are known to be involved in its pathogenesis. In this study, we analyzed a model of hapten-induced contact dermatitis by topical application of DNFB to the earlobe in mice. Six-week-old female BALB/c mice were treated with 25 μL of DNFB or solvent per ear on the back of the ear, and the thickness of the ear was measured with calipers before and 24 hours after application. Applications were made once a week for 5 weeks, and 24 hours after the fifth application, blood samples were taken under deep anesthesia and necropsied, and ear tissues were collected. Ear thickness increased significantly in the DNFB group 24 hours after the second application. Histopathologically, dermal thickening, dermal stasis and mast cell degranulation were observed in the ears of the DNFB group. Furthermore, immunohistochemical (IHC) staining showed increased helper T cells (CD4), killer T cells (CD8), dendritic cells (CD11a) and macrophages (F4/80) in the ear foci. TB staining revealed an increased proportion of mast cells with visible nuclei, suggesting degranulation and histamine release. Gene expression analysis showed that the mRNA expression of TNF-α, IL1-β, IL-4 and IL-6 was increased in the ears of the DNFB group. These data suggest that this model exhibits a locally mixed Th1/Th2 inflammatory immune response in the ear.

Oral Presentation 12 (Room 1)

In Silico Screening of Flavonoid Glycosides and Their Aglycones as Potential PPARγ Modulators

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Flavonoids are widely distributed natural compounds known for their diverse pharmacological properties, including antidiabetic potential mediated through modulation of peroxisome proliferator-activated receptor gamma (PPARγ). These compounds occur in both glycosidic and aglycone forms, which may exhibit distinct binding characteristics and biological activities. This study aimed to evaluate the binding affinity of selected natural flavonoid glycosides and their aglycone counterparts to PPARγ using molecular docking analysis, with troglitazone and luteolin serving as reference ligands. Molecular docking simulations were performed using the crystal structure of the PPARγ ligand-binding domain. The compounds screened included rutin, quercetin, orientin, luteolin, vitexin, apigenin, hesperetin, hesperidin, naringin, and naringenin. Both glycosidic and aglycone forms were selected to assess structure–activity relationships. Troglitazone (a full agonist) and luteolin (a partial agonist) were employed as positive controls. Docking was conducted using PyRx software, and binding affinities were evaluated based on calculated Gibbs free energy (ΔG) values and key protein–ligand interaction profiles. All tested flavonoids exhibited favorable binding affinities, with ΔG values ranging from –6.2 to –9.1 kcal/mol. Aglycones such as quercetin, luteolin, and apigenin showed stronger binding compared to their glycosidic analogs. Several compounds formed hydrogen bonds with crucial residues within the PPARγ binding site. Notably, quercetin and naringenin demonstrated binding profiles comparable to luteolin, indicating potential partial agonist activity. Additional docking studies involving GW9662-bound PPARγ revealed that all aglycones may serve as compatible partner ligands, supporting their potential use in ligand-linking strategies for the design of novel PPARγ agonists. These docking results suggest that natural flavonoids, particularly their aglycone forms, hold promise as modulators of PPARγ, either as standalone agents or in combination with GW9662 in hybrid ligand approaches. Further in vitro

validation is warranted to confirm their functional activity and therapeutic relevance for metabolic disease intervention.

Keywords: PPARγ, flavonoids, glycosides, aglycones, molecular docking, natural products, troglitazone, luteolin.

Oral Presentation 13 (Room 1)

TP53 Expression in Breast Cancer and Fibroadenoma Mammae: A case study in RSAU Dr. Salamun Bandung

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Breast cancer is the leading cause of cancer-related mortality among women worldwide, including Indonesia, which has recorded an increasing prevalence in the last five years [1][2]. Breast cancer is a multifactorial disease caused by endocrinal and genetic factors [3]. Different genes had been reported to be involved in tumorigenesis and/or further development [4][5][6]. Had been widely known that Double Strand Break (DSB) causing breast cancer [7]. TP53 is one among other genes responsible for DSB repair, cell cycle regulation, and apoptosis induction [8][9][10]. This study aimed to analyse the possible involvement of TP53 gene in breast cancer and Fibroadenoma Mammae (FAM) tissues from patients at RSAU Dr. M. Salamun, Bandung. A total of six breast tumor tissue including two samples of Invasive Carcinoma of No Special Type (grades II and III) and three FAM samples were analysed. *TP53* gene expression was analysed using qPCR method. The expression level was calculated using $2^{-\Delta Ct}$ relative quantification method, and relative expression levels were compared among samples based on fold change values. The results showed that the highest expression was found in the grade II breast cancer sample, followed by FAM, while the lowest expression was observed in the grade III breast cancer sample. These findings suggest that the *TP53* gene expression variation depends on tumor type and grade. Further studies with larger sample

sizes, specific mutation of *TP53* and other tumor regulatory genes analyses, as well as protein-level expression validation, are needed to strengthen these findings for breast cancer cases in Indonesia.

Keywords: TP53, breast cancer, *fibroadenoma mammae*, gene expression, molecular biomarker.

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Oral Presentation 13 (Room 1)

Phytochemical Strategy Against *Plasmodium*: A Functional Ethanol Extract from *Canna indica*

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Malaria is an infectious disease caused by *Plasmodium* parasites and transmitted by female Anopheles mosquitoes. Due to the increasing resistance to conventional antimalarial drugs such as chloroquine and sulfadoxine-pyrimethamine, and emerging resistance to artemisinin, alternative therapies from natural products are being explored. *Canna indica* leaves, traditionally used in herbal medicine for malaria, have shown promising potential. Previous *in silico* studies supported its bioactivity through multiple target interactions, including inhibition of key malaria-related pathways. This study aimed to evaluate the antimalarial activity of ethanol extract of *Canna indica* leaves *in vitro*. The extract was prepared using Soxhlet extraction with 96% ethanol and analyzed by GC-MS to identify active compounds. *In vitro* antimalarial activity was tested against *Plasmodium berghei* at five concentrations (100, 10, 1, 0.1, 0.01 µg/mL). GC-MS analysis revealed the presence of multiple bioactive compounds, with the most dominant being 9-Octadecenoic acid (Z) (36.24% area), followed by Hexadecanoic acid (27.54%), Methyl Stearate (11.88%), Methyl hexadec-9-enoate (3.69%), Beta-sitosterol (1.32%), Methyl tetradecanoate (1.27%), Z-5-Methyl-6-heneicosen-11-one (1.21%), and cis-13-Eicosenoic acid (1.11%). Several other compounds were also detected in lower concentrations (<1%). These constituents are known to exhibit various bioactivities, including antimalarial mechanisms. The ethanol extract caused morphological damage to *Plasmodium berghei*, indicating parasiticidal activity. The IC_{50} value of the extract was 1.30 µg/mL, categorized as highly active. ANOVA followed by Tukey HSD test showed significant differences ($p<0.05$) in parasitic growth inhibition across concentrations, with 100 µg/mL being the most effective. Ethanol extract of *Canna indica* leaves exhibits strong antimalarial potential and qualifies as a promising herbal candidate for alternative antimalarial drug development. Further studies are recommended to isolate and characterize active fractions and elucidate detailed mechanisms of action.

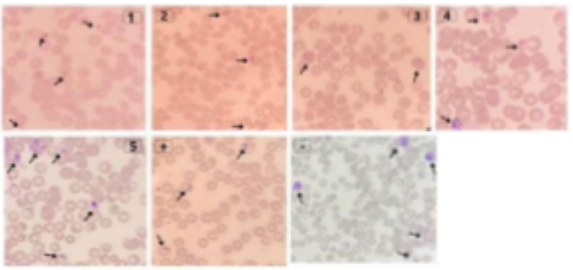

Figure 1. Morphological changes of Plasmodium berghei-infected red blood cells after treatment with ethanol extract of *Canna indica* leaves at varying concentrations.

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Oral Presentation 1 (Room 2)

Interaction Of Dextran Sodium Sulfate-Induced Colitis And Diet-Induced MASLD In Mice

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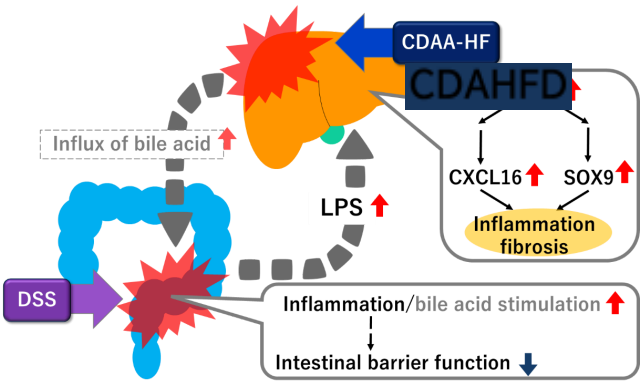
Metabolic dysfunction associated steatotic liver disease (MASLD) is a lifestyle-related disease. A gut-liver axis is involved in the progression of MASLD. Disruption of the intestinal barrier function is an exacerbating factor of MASLD. In this study, we have investigated the interaction between colitis and MASLD in mouse models of dextran sodium sulfate (DSS)-induced colitis and diet-induced MASLD -like lesions. Male C57BL/6J mice were provided with a choline-deficient, L-amino acid-defined, high-fat diet (CDAHFD) and 1.25% DSS water for 3 weeks. The liver and large intestine were excised**.** Portions of these organs were immediately fixed in 10% neutrally buffered formalin for histopathological and immunohistochemical examinations, and the remaining samples were stored at -80℃ for molecular biological assessments. The DSS water was administered intermittently. In the large intestine, the DSS-treated groups clearly demonstrated inflammation. Dilation of crypt and goblet cells was observed in the DSS + CDAHFD group. The expression of minor inflammation-related genes was increased in the CDAHFD group. In liver, CDAHFD group demonstrated metabolic dysfunction associated steatohepatitis (MASH)-like lesions. The number of C-X-C motif chemokine ligand 16 (CXCL16)-positive cells increased in the CDAHFD group and tended to increase in the DSS + CDAHFD group. Toll-like receptor 4 (TLR4)-positive cells were observed mainly in gallbladder epithelial cells in all groups and were more pronounced in the DSS-administered groups. Inflammation-related genes were upregulated in the DSS group. The expression of fibrosis-related genes increased in the DSS + CDAHFD group. DSS-induced colitis and CDAHFD-induced MASH interacted with each other. MASLD lesions were induced by CDAHFD and exacerbated by TLR4 and CXCL16 in DSS-induced colitis. Colitis is induced by DSS and exacerbated by changes in the intestinal environment due to liver injury. This combined model was useful in analyzing early lesions of liver-gut axis for MASLD.



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Oral Presentation 2 (Room 2)

Exploration Of Partial Epithelial-Mesenchymal Transition Induction In Proximal Tubular Epithelial Cells And Its Relation To Fibrosis Of The Renal Stroma In Rats On A High Phosphorus Diet

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Recently, the number of CKD patients has been increasing. CKD is a poor prognosis disease and significantly reduces patients' quality of life. One of the typical lesions in CKD is renal interstitial fibrosis. Fibrosis correlates with the degree of decline in renal function. Therefore, fibrosis is being studied as a therapeutic target. Partial epithelial-mesenchymal transition(pEMT) has been proposed as a new fibrosis mechanism. pEMT is defined as epithelial cells remaining attached to the basement membrane and having mesenchymal cell capacity (Fig.1). There are still a few studies on pEMT and the development of fibrosis in the renal interstitial. The present study examined whether pEMT contributes to fibrosis progression of the renal interstitial in CKD due to high phosphorus intake. In this study, SD rats treated uninephrectomy and fed 1.5% KH_2PO_4 were prepared for the high phosphorus intake group and SD rats treated uninephrectomy and fed 0.3% KH_2PO_4 were prepared for the control group (Table1). Analysis items included Hematoxylin and Eosin (HE) staining, Sirius-Red (SR) staining for fibrosis, and Immunohistochemistry (IHC) staining for detection of pEMT. Results of the analysis, tubule disorders and renal fibrosis were observed in SD rats fed 1.5%-KH_2PO_4 (Fig.2). For IHC-staining, AQP-1 expression was decreased in proximal tubular epithelial cells (PTECs) and Vimentin expression was observed in PTECs as for SD rats fed 1.5%-KH_2PO_4. These results suggest that PTECs were induced in pEMT and contributed to the development of fibrosis.

Oral Presentation 3 (Room 2)

Antibacterial Mechanism of Action of *Poikilospermum suaveolens* (Blume) Merr. Stem Extract on the Cell Membrane of *Staphylococcus epidermidis*

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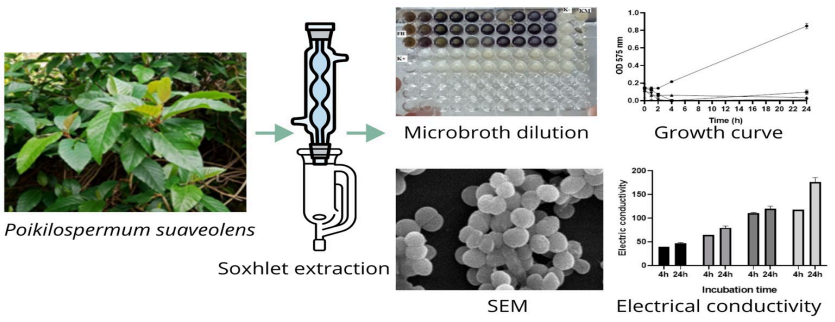
Poikilospermum suaveolens, a lesser-known medicinal plant belonging to the Urticaceae family, has shown antimicrobial activity. Phytochemical investigations have revealed the presence of flavonoids, terpenoids, tannins, and alkaloids in its extract, many of which are known to possess antibacterial properties. However, the specific mechanism of action by which *P. suaveolens* exerts its antibacterial effects against *S. epidermidis* remains to be fully elucidated. The aim of this study was to investigate the antibacterial mechanism of action of the methanol extract of *P. suaveolens stem* (MEPS) against *S. epidermidis*. The antibacterial activity of MEPS against *S. epidermidis* was determined by broth microdilution. The antibacterial mechanism of action of MEPS was investigated by observing morphological alterations with a scanning electron microscope. Meanwhile, cell membrane permeability disturbances were detected by the electrical conductivity measurement, and the presence of cell leakage was determined using a spectrophotometer. MEPS treatment showed antibacterial activity against *S. epidermidis*. According to scanning electron microscope (SEM) observations, the MEPS treatment showed morphological alterations *S. epidermidis* cells. MEPS treatment caused the reduction in membrane potential by increasing electrical conductivity. In addition, the release of macromolecules, including nucleic acids and proteins, confirms the cell leakage caused by MEPS treatment. In summary, MEPS treatment alters the morphology of *S. epidermidis* cell, interferes with the permeability of the cell membrane, and causes cell leakage.



Oral Presentation 4 (Room 2)

Mobile-Based Papilledema Detection from Fundus Images Using MobileNet V2: A Deep Learning Approach for Screening Increased Intracranial Pressure

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Papilledema, characterized by optic disc swelling due to increased intracranial pressure, represents a critical clinical finding that requires prompt recognition to prevent vision loss, neurological impairment, or death. Early and accurate detection is essential, yet distinguishing papilledema from pseudopapilledema remains challenging in clinical practice. Mobile-based diagnostic tools could enhance accessibility and efficiency of papilledema screening, particularly in resource-limited settings. We developed a JavaScript-based mobile application utilizing MobileNet V2 architecture for binary classification of papilledema versus non-papilledema (including pseudopapilledema and normal retina). The model was trained on a dataset of 300 fundus images comprising 100 papilledema cases, 100 pseudopapilledema cases, and 100 normal retinal images. Pseudopapilledema and normal cases were grouped as non-papilledema for binary classification. The dataset was sourced from Kim et al. (2018). Model performance was evaluated using standard diagnostic metrics. The mobile application demonstrated promising diagnostic performance with a sensitivity of 88.0% (22/25), specificity of 92.0% (23/25), positive predictive value of 91.7% (22/24), and negative predictive value of 88.5% (23/26). The overall accuracy was 90.0% (45/50). The application correctly identified 22 true papilledema cases while maintaining a low false positive rate of 8.0%. Our MobileNet V2-based mobile application shows potential as a screening tool for papilledema detection from fundus images. The high specificity (92.0%) is particularly valuable for reducing unnecessary invasive procedures such as lumbar puncture and extensive neuroimaging. This mobile-based approach could assist healthcare providers, especially in primary care settings, to identify patients requiring urgent ophthalmologic and neurologic evaluation. Further validation with larger, more diverse datasets and clinical trials are needed to establish the application's utility in real-world clinical practice.

Keywords: papilledema, mobile health, deep learning, MobileNet V2, fundus photography, intracranial pressure, automated diagnosis

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Invited Speaker 3

Anthocyanin Extract from Indonesian Purple Sweet Potatoes Influences Behavior and Brain Function in a Stress-Exposed Animal Model

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Stress triggers a wide range of molecular responses, including inflammation and oxidative damage, which can significantly impair both physical and mental health, potentially leading to various disorders. Bioactive compounds derived from plants are well-recognized for their adaptogenic properties that support stress recovery. This study investigated the effects of an anthocyanin-rich extract (ANC) derived from a local Indonesian cultivar of purple sweet potato (PSP) on behavioral patterns and brain-related parameters in stress-exposed animal models. Results demonstrated that ANC supplementation reduced locomotor activity in both adolescent and adult mice, as reflected in decreased total distance traveled and movement speed. Neurotransmitter analysis revealed that ANC enhanced levels of dopamine and gamma-aminobutyric acid (GABA) in the brain, along with a reduction in cortisol levels. Furthermore, ANC exhibited anti-inflammatory effects by elevating the IL-10/IL-6 cytokine ratio. This presentation also explores the impact of ANC on various stress-affected tissues and predicts molecular interactions between ANC and neurotransmitter receptors. These findings highlight the potential of ANC from Indonesian purple sweet potatoes as a natural agent to mitigate stress-induced effects on health.

Keywords: antioxidant, antiinflammation, purple sweet potato, stress

Oral Presentation 5 (Room 2)

Total Phenolic Content and Antioxidant Activity of Coffee Leaves and Coffee Bean Extract

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Coffee leaves and beans contain polyphenolic compounds that have antioxidant activity. Some researchers also report that coffee extract has a function as a skin photoprotector against UV exposure. So far, the use of coffee beans is mostly in the form of drinks to increase stamina. Coffee leaves are used as a beverage ingredient in some areas. Different parts of the coffee plant may contain different active substances and different antioxidant potentials. The study aims to determine the total phenolic content and antioxidant activity of the ethanol extract of leaves and beans of coffee. Samples of coffee were obtained from Kerinci Regency, Jambi. The extract was obtained by the maceration method using ethanol as a solvent. Determination of total phenol content was carried out by the spectrophotometric method with the Folin-Ciocalteu reagent. Total phenol content was expressed as mg/g Gallic acid equivalent (GAE). The antioxidant activity test was carried out spectrophotometrically with the DPPH radical scavenging method. Gallic acid was used as a positive control. Antioxidant activity is expressed as IC_{50}. The results showed that the total phenolic content of coffee leaves, dry beans, and roasted bean extract (mg/g GAE) was 279.37, 152.00, and 140.64. The magnitude of the antioxidant activity of gallic acid as a positive control and the three extracts in succession was. 2.06, leaves 34.46, dry beans 57.52, and roasted beans 94.06 µg/ml. All three extracts have strong antioxidant potential. The leaves of coffee extract have the highest total phenolic content and potential antioxidant activity

Oral Presentation 6 (Room 2)

Study on The Purification and Bioconversion of Proinsulin Glargine for Production of Recombinant Insulin Glargine Using Pichia pastoris

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Diabetes mellitus is a metabolic disease due to impaired insulin function. Common treatment for patients with diabetes mellitus is through injection of insulin analog, such as insulin glargine, but the need for insulin in Indonesia is still insufficient. This study aims to analyze the optimum conditions of fermentation, purification and bioconversion of proinsulin glargine into insulin glargine. Recombinant Pichia pastoris X33 cells carrying insulin glargine gene were fed-batch fermented, purified using ion exchange chromatography, and enzymatically bioconverted with trypsin optimized at solution pH and buffer pH. Analysis was performed using UV-VIS spectrophotometry 600 nm, Bradford Assay, SDS-PAGE and RP-HPLC**.** The results showed optimum conditions for fermentation in ½ BSM media with 2% methanol concentration, followed by the optimal purification at pH 4, flowrate 5.5 mL/min, initial volume of 30 ml with 5x dilution and optimal bioconversion at Tris Buffer pH 8 and pH solution 8.5. The results of RP-HPLC analysis showed that the target proinsulin glargine peak appeared at various retention times, namely in batch 1 fermentation obtained 19.671 minutes of ½ BSM and 22.668 minutes of BMMY, fermentation batch 2 obtained 18.759 minutes. In addition, the purification optimization result showed that the target peak appeared at the 18th minute, indicated good purification process efficiency.

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Invited Speaker 5

Enhancing Bispecific Antibody-Based Immunotherapy for Pancreatic Cancer via 4-1BB/4-1BBL Co-Stimulation: A Targeted Molecular Strategy from Tumor Microenvironment Insights

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Pancreatic cancer (PC) remains one of the most lethal malignancies, largely due to its complex and immunosuppressive tumor microenvironment (TME). The dense stroma and immune-desert phenotype limit antibody penetration and T cell infiltration, posing major obstacles to effective immunotherapy. This study explores the potential of 4-1BB/4-1BBL co-stimulation to enhance the efficacy of hEx3, a T cell-dependent bispecific antibody (TDB) targeting EGFR and CD3. RNA-seq analysis of TCGA datasets using the Subio platform identified 4-1BB/4-1BBL as a key immune axis upregulated in lymphocyte-rich PC tissues. To validate this, we used human PC cell lines (BxPC3, KP-2, Capan1) and PBMC-derived T cells. Exhausted T cells were generated using CD3/CD28 Dynabeads. Flow cytometry was performed to examine the expression of EGFR, 4-1BB, and exhaustion markers. T cell proliferation assays under IL-2 and/or 4-1BBL conditions, cytotoxicity assays combining hEx3 and 4-1BBL, and IFN-γ ELISA were conducted. While 4-1BBL had minimal impact on T cell proliferation, it significantly boosted hEx3-mediated cytotoxicity at low doses (0.01–1 ng/mL), especially in KP-2 cells. Interestingly, this enhancement was not associated with increased IFN-γ secretion, indicating a non-cytokine-mediated mechanism, potentially involving stronger immunological synapse formation between T cells and cancer cells. These findings highlight 4-1BB/4-1BBL co-stimulation as a promising strategy to improve the antitumor activity of bispecific antibodies in pancreatic cancer.

Keywords: 4-1BB, 4-1BBL, bispecific antibody, pancreatic cancer, tumor microenvironment

Oral Presentation 7 (Room 2)

Virtual prediction of β-Glucogallin from Malacca fruit (*Phyllanthus emblica*) as an antihypertensive targeting ACE and AT1R in *Chronic Kidney Disease*

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Chronic Kidney Disease (CKD) is one of the leading causes of death worldwide, with hypertension as a major risk factor. Activation of the *renin-angiotensin system* (RAS) contributes to CKD complications, including hypertension and renal fibrosis. β-Glucogallin, a bioactive compound isolated from Malacca fruit (*Phyllanthus emblica*), shows therapeutic potential in RAS modulation. This study aims to identify and evaluate the potential of β-Glucogallin as an *angiotensin-converting enzyme* (ACE) and *angiotensin II type 1 receptor* (AT1R) inhibitor through an *in silico* approach, thereby providing new insights for CKD treatment. Ligand and protein preparation, bioavailability and toxicity prediction, molecular docking, and molecular dynamics simulation. The results showed β-Glucogallin has strong binding affinity and stable interactions with key residues of ACE (Gln281, His353, His383, and Tyr523), and AT1R (Trp84 and Lys199), with binding affinity values of -8,0 Kcal/mol for ACE and -7,4 Kcal/mol for AT1R. Molecular dynamics simulations demonstrated good stability of the ligand-protein complex, with RSMD and RMSF values below 3Å, indicating stable interactions during simulations and confirming its potential as an effective inhibitor. Despite slight deviations, β-Glucogallin fulfils the Lipinski criteria as a viable drug candidate for CKD treatment through RAS inhibition. This study demonstrates that β-Glucogallin from Malacca fruit shows therapeutic potential as an antihypertensive agent by modulating the RAS pathway. The mechanism of action involves inhibition of ACE activity and AT1R, achieved by binding to key residues in their active sites, thereby preventing the conversion of Ang I to Ang II. Further *in vitro* and *in vivo* studies are necessary to confirm the inhibition mechanism and pharmacological efficacy of β-Glucogallin.

Keywords: *ACE, AT1R, β-Glucogallin, Phyllanthus emblica, in silico*

Oral Presentation 8 (Room 2)

Comparison Clinical Symptom Profile And Outcomes Of Tuberculous Meningitis Patients With Anti-Tuberculosis Drugs Induced Liver Injury (At-Dili)

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Tuberculous meningitis is a severe manifestation of extrapulmonary tuberculosis that frequently presents with non-specific symptoms, leading to delayed diagnosis and treatment. Indonesia ranks third globally in tuberculosis burden. Standard anti-tuberculosis therapy (ATT) includes isoniazid, rifampicin, pyrazinamide, and ethambutol; however, drug-induced liver injury (DILI) remains a significant adverse effect that may compromise treatment adherence and increase mortality. A descriptive retrospective study was conducted at Dr. Saiful Anwar General Hospital, Malang, from September 2023 to September 2024. Medical records of Tuberculous meningitis patients with and without DILI secondary to ATT were analyzed using descriptive statistical methods to evaluate demographic characteristics, clinical presentations, hospitalization duration, and clinical outcomes. Among Tuberculous meningitis patients who developed DILI, the majority were male (71.42%) and aged 31-45 years (42.85%). The most frequently observed clinical symptoms included nausea and vomiting (85%), abdominal pain (71%), loss of appetite (71%), and jaundice (14%). Most patients required hospitalization exceeding 30 days. Overall mortality among TBM patients was 50%, with a notably higher mortality rate of 71% in the DILI group. While no statistically significant association was found between DILI and mortality in Tuberculous meningitis patients ($p > 0.5$), an odds ratio of 3 suggests a trend toward increased mortality risk in patients with DILI. DILI represents a significant complication of anti-tuberculosis therapy in TBM patients, contributing to prolonged hospitalization and elevated mortality rates. Early detection and continuous monitoring of liver function are essential for improving clinical outcomes in this vulnerable patient population.

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Oral Presentation 9 (Room 2)

Transglycosylation Activity of the β-Glucosidase Enzyme from *Paenibacillus polymyxa* Bacteria on Glycerol Substrate

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2025

β-Glucosidase plays a crucial role in the cleavage of glycosidic bonds and is known to possess high transglycosylation potential. This activity enables the synthesis of glycosides such as *glycosylglycerol*, a compound with wide-ranging applications in the cosmetics, pharmaceutical, and food industries. This study aims to express and evaluate the transglycosylation activity of β-glucosidase from *Paenibacillus polymyxa* toward glycerol as a substrate, determine the optimal reaction conditions, and identify the resulting transglycosylation products. The research steps included enzyme expression, protein quantification, SDS-PAGE analysis, enzymatic activity assay using *p*NPG, as well as transglycosylation assays and optimization with varying concentrations of lactose and glycerol. Product detection and characterization were carried out using TLC and LC-HRMS. The results showed that the enzyme was successfully expressed, with a molecular weight of approximately 52 kDa, a protein concentration of 6.65 mg/mL, and an enzymatic activity of 3.25 U/mL. The addition of glycerol in the enzymatic reaction led to the formation of a transglycosylation product, with optimal conditions achieved at 150 mM lactose and 1M glycerol. LC-HRMS identified the compound 3-O-β-D-galactosyl-sn-glycerol at a retention time of 0.78 minutes. These findings confirm that β-glucosidase exhibits transglycosylation activity and holds potential for glycosylglycerol production in various industrial applications.

Keywords: β-glucosidase, glycosylglycerol, *Paenibacillus polymyxa*, transglycosylation.

Oral Presentation 10 (Room 2)

The Effect of Genistein Compound from *Solanum lycopersicum* on the Differentiation and Lipid Accumulation of 3T3-L1 Cells

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Obesity, which is characterised by the excessive accumulation of adipose tissue, is a growing global health issue that contributes to various metabolic and cardiovascular complications. The development of obesity involves the proliferation and differentiation of adipocytes, as well as the accumulation of intracellular lipids. This study investigated the effects of genistein on cell viability and lipid accumulation in an obesity cell model. Pre-adipocyte 3T3-L1 cells were induced into adipocytes using a differentiation cocktail to create the in vitro model. Cell viability was assessed using an MTT (3-(4,5-dimethylthiazol-2-yl)-2,5-diphenyltetrazolium bromide) assay to evaluate potential cytotoxicity and proliferation following treatment. Intracellular lipid accumulation was evaluated using oil red o staining. The results showed that treatment with genistein at specific concentrations significantly affected cell viability and reduced lipid accumulation in differentiated adipocytes. These results suggest that genistein has the potential to be an anti-obesity agent, possibly by inhibiting adipocyte differentiation or modulating lipid metabolism. Further studies are needed to identify the molecular pathways involved and confirm these effects in vivo.

Keywords: Adipocytes, Bioactive compounds, Genistein, Lipid accumulation, Obesity

Oral Presentation 11 (Room 2)

Targeting Breast Cancer Angiogenesis Pathway Using Myricetin from Local Grape Seed Through *In-silico* Approach

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Breast cancer remains one of the leading causes of death worldwide, with incidence rates continuously increasing [1]. One crucial mechanism in its progression is angiogenesis, which can be targeted through the Wnt5a signalling pathway [2]. This study aimed to explore the potential of Myricetin, a bioactive compound from red grape seeds, as an angiogenesis inhibitor in breast cancer through an *in-silico* approach. The methods employed included molecular docking, HOMO-LUMO analysis, and evaluation based on Lipinski's Rule of Five using various software tools such as AutoDock, Open Babel, and Biovia Discovery Studio. The results showed that Myricetin exhibited a stronger binding affinity to β-catenin (-5.07 kcal/mol) compared to the control drug, Doxorubicin. Furthermore, Myricetin demonstrated a higher dipole moment, suggesting better interaction in polar environments. Amino acid residue analysis indicated that Myricetin and Doxorubicin interacted at similar binding sites on target proteins. This study highlights Myricetin's potential as a candidate of angiogenesis inhibitor through the Wnt5a pathway in breast cancer.

Keywords: Breast Cancer, Angiogenesis, Myricetin, *in-silico*

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Oral Presentation 12 (Room 2)

Microencapsulation of Ethanol Extract of *Delonix regia* Leaves with The Influence of Sodium Alginate Concentration and Stirring Time and Its Antioxidant Activity Test

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Delonix regia is known to contain flavonoids such as quercetin and kaempferol, which have high antioxidant activity. However, flavonoids are labile to environmental influences such as light and temperature. To improve their stability, microencapsulation was applied. This study aims to examine the encapsulation process using freeze-drying technique, the effect of the variable pair of sodium alginate concentration and stirring time on the characteristics of *Delonix regia* extract microcapsules and its antioxidant activity. *Delonix regia* leaves were extracted for 72 hours with ethanol and the maceration process. The ionotropic gelation process was used for microencapsulation, with sodium alginate as the coating and $CaCl_2$ as the cross-linking agent. The resulting alginate beads underwent freeze-drying. The microencapsulation formulation was developed using Response Surface Methodology (RSM) with a Central Composite Design (CCD) to evaluate the relationship between sodium alginate concentration (0.5–3%) and stirring time (5–70 minutes) with response parameter (Encapsulation Efficiency (%EE) value) through statistical analysis. The optimum microencapsulation condition were determined based on the highest %EE. Characterization was performed using Fourier Transform Infrared (FTIR) and Scanning Electron Microscope (SEM). Antioxidant activity was evaluated using the DPPH (2,2-diphenyl-1-picrylhydrazy) assay and calculated based on the IC_{50} value. The optimum conditions of microencapsulation were obtained at a sodium alginate concentration of 1,75% and stirring time of 37,5 min, yielding a %EE value of 82,26%. FTIR analysis showed the presence of COO^- groups from sodium alginate and C=O and C-H Sp^3 groups from the active ingredient (flavonoid). SEM analysis revealed that the microcapsules had a slightly spherical morphology, followed by a uniform distribution of wrinkled surfaces and serrated surfaces, with a size range of 2.48–4.01 μm. The DPPH assay yielded IC_{50} values of

1.03, 11.24, and 34.33 µg/ml for quercetin, extract, and microcapsules, demonstrating that these samples are very strong antioxidants. Microencapsulation of ethanol extract of *Delonix regia* was successfully processed using the freeze-drying technique with sodium alginate as coating material. The optimum formulation increased its stability, demonstrated high encapsulation efficiency, good physical characteristics, and maintained its antioxidant activity, supporting its potential as a microencapsulated natural antioxidant product.

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Oral Presentation 13 (Room 2)

Anti-Adipogenic Effects of γ-Oryzanol Extracted from Brown Rice in Hypercholesterolemic Rats

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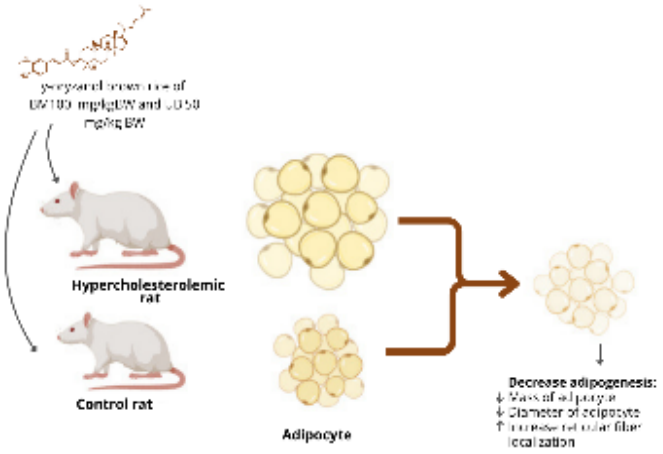
Hypercholesterolemia is a disorder of cholesterol metabolism that promotes excessive lipid accumulation in adipose tissue, leading to increased adipogenesis. This study aimed to evaluate the effect of γ-oryzanol extracted from brown rice on the histomorphometry of adipose tissue in hypercholesterolemic rats. Forty-eight male Sprague-Dawley rats were divided into normal control (C) and hypercholesterolemic (H) groups. Control rats received a standard diet, while hypercholesterolemic rats were fed a high-goat fat diet for eight weeks. The hypercholesterolemic and control rats were further subdivided into six groups: untreated, gold standard γ-oryzanol (O, 100 mg/kg BW), γ-oryzanol from Black Madras (BM) and Universitas Brawijaya (UB) brown rice at doses of 50 and 100 mg/kg BW, respectively, administered orally for 28 days. Adipose tissue samples were processed using paraffin hematoxylin-eosin staining. Administration of γ-oryzanol UB50 (50 mg/kg BW) significantly reduced adipocyte diameter (3.42±0.43 µm), lower than in untreated hypercholesterolemic rats (8.4±0.87 µm) ($p<0.05$), closer to that of untreated controls (4.42±0.32 µm). In contrast, γ-oryzanol BM50 (50 mg/kg BW) administration tended to increase adipocyte size in hypercholesterolemic and control rats. Administration of γ-oryzanol BM100 (100 mg/kg BW) significantly reduced adipocyte



mass (0.33 ± 0.20 g) compared to the untreated hypercholesterolemic (1.86 ± 0.80 g) ($p<0.05$). In comparison, administration of gold standard γ-oryzanol 100 (100 mg/kg BW) showed decreased adipocyte mass (0.44±0.18 g) in control rats. This study proposed that γ-oryzanol extracted from brown rice has the potential to attenuate adipogenesis in hypercholesterolemic rats by reducing adipocyte size, thereby contributing to a decrease in adipose tissue mass.

Keywords: Adipogenesis, brown rice, γ-oryzanol, hypercholesterolemia

Online Presentation 1 (Room 3)

Exploring The Therapeutic Promise Of Mortalin: A Novel Target Against Cancers Prevalent In Northeast India

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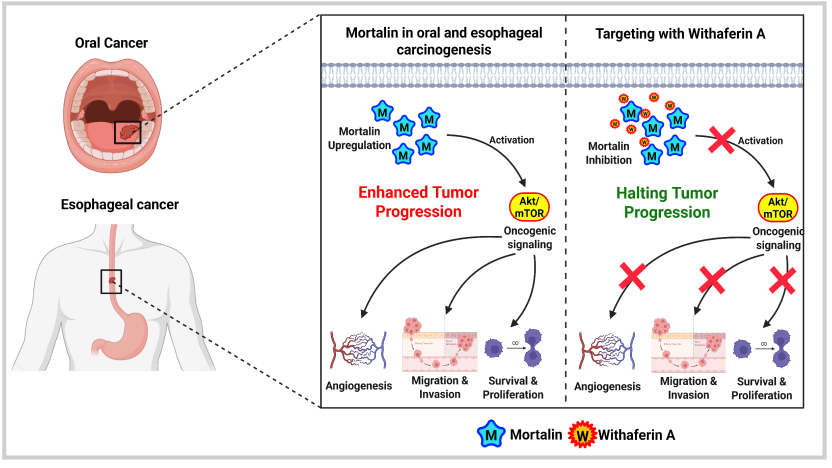
Oral and esophageal cancers are some of the most common malignancies, especially in North-East region of India. Despite the current treatment modalities, the survival rate of the patients has not improved due to chemoresistance, tumor recurrence and metastasis, and severe adverse side effects of the drugs. Therefore, there is an urgent need for developing novel molecular targets and drugs for the management of this cancer. Hence, the current study delineates the involvement of Mortalin in oral and esophageal cancer as well as investigates the potential of withaferin A (Wi-A) in inhibiting Mortalin and hallmarks associated with this disease. Expression of Mortalin in HNSCC and esophageal cancer was evaluated using the TCGA database, and validated through immunoblotting, immunohistochemistry, and real-time PCR in cell lines and patient samples. Survival, correlation, and single-cell RNA-sequencing analyses were conducted utilizing TCGA database and NCBI GEO repository. *In vitro* assays, including MTT, colony formation, PI FACS, annexin V, JC-1, autophagy, EMT, migration, and Boyden chamber assays, were performed using siRNA-mediated knockdown and Wi-A treated oral cancer cells. The current study showed that Mortalin was significantly overexpressed in oral and esophageal cancer cells and tissues and was associated with the poor survival in patients. This overexpression was observed across diverse grade, stage, tumor size, and lymph node metastasis. Molecular studies revealed the association of this protein in modulating cell survival, proliferation, invasion and via Akt/mTOR signaling cascades in oral and esophageal cancer. Extending the studies with



Wi-A, it was found to suppress Mortalin and its effector oncogenic processes involved in carcinogenesis and its progression to aggressive stages. We report that upregulation of Mortalin is a clinically relevant physiological marker for oral cancers. Furthermore, Wi-A (a withanolide from Ashwagandha) hold potential for suppressing mortalin and mortalin-driven oncogenic signaling offering a its anticancer drug-ability that warrants clinical trials.

Keywords: Oral cancer, Esophageal cancer, Mortalin, Withaferin A, Akt pathway

Online Presentation 2 (Room 3)

Fucoxanthin Present in Brown Seaweeds Has Potential To Treat Protein-Aggregation Related Pathologies

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Stress is an inevitable component of life and has been connected to the poor quality of life, specially towards later years of human lifespan when there is a decrease in efficiency of damage-repair processes. Recruitment of natural compounds for stress management is expected to decrease the disease burden and hence benefit the health care system. Fucoxanthin is a popular carotenoid found in marine organisms and known for its antioxidant properties. In this presentation, we will share an antistress potentials of Fucoxanthin that may be useful for management of stress and old-age related pathologies. First, we recruited a unique amyloid β (Aβ) protein aggregation (an established causative factor of Alzheimer's disease) based *in vitro* screening system to identify compounds possessing protein-deaggregation potential and selected Fucoxanthin as a candidate compound. To address further functions of Fucoxanthin, cultured cells were evaluated for the effects of fucoxanthin on various stress inducers such as heat shock, tunicamycin (ER stress), sodium arsenite ($NaAsO_2$, heavy metal) and cellular senescence. Furthermore, to test the ER stress-protective effects of Fucoxanthin in human neurons, we used cerebral organoids. First, we focused on exploring the function of Fucoxanthin related to protein aggregation by ER stress. Treatment with tunicamycin induces ER stress and increases both XBP-1s, which is transcription factor inducing genes for molecular chaperones and genes involved in ER-associated degradation under IRE1 pathway, and CHOP protein that triggers apoptosis under PERK/ATF4 pathway activated by ER stress. Indeed, Fucoxanthin reduced protein aggregations that estimated by GFP/luciferase aggregation assay, and protein expression levels of XBP-1s and CHOP. In addition to other cell lines, Fucoxanthin contributed to the reduction of TM-induced ER stress in cerebral organoids. Moreover, Fucoxanthin also decreased the expression of p16, cellular senescence marker, and reactive oxygen species

(ROS) in senescence human fibroblasts, which indicates that Fucoxanthin caused delay in cellular senescence. Fucoxanthin might recover the effects on various stresses that induce protein-misfolding and aggregation and cellular senescence in various cell types. In summary, Fucoxanthin, which is abundant in wakame seaweed, has been shown the resistance against stress response and senile lesions at the cellular level.

Online Presentation 3 (Room 3)

Smart Probes of Saponin for Its Efficient Target Identification and Mechanistic Studies

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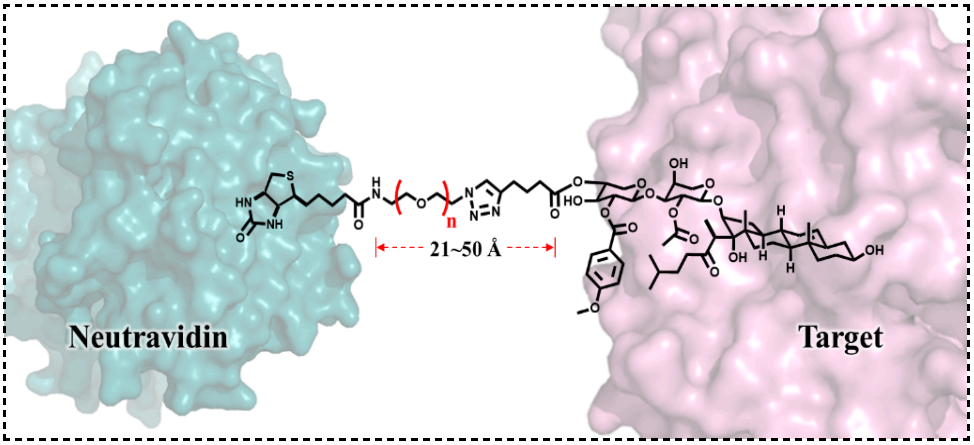
Natural products have long been a rich source of bioactive compounds, yet their clinical translation is often hindered by a lack of clarity around their precise mechanisms of action. Saponins, a class of steroidal natural products, exhibit promising anticancer activity, with Orsaponin (OSW-1) being one of the most potent representatives. However, its multiple biological effects suggest that the full spectrum of its molecular targets remains incompletely understood. In this study, we employed a chemical biology approach to develop and optimize biotin-tagged OSW-1 probes to identify its binding proteins and understand its mechanism(s) of action. Using a site-selective monoacylation strategy, we synthesized a series of OSW-1-based chemical probes with varying polyethylene glycol (PEG) linker lengths to investigate how spatial design influences target capture. These probes were incubated with cell lysates to perform affinity-based pull-down assays followed by mass spectrometry to identify bound proteins. We also compared cytotoxicity of the probes with the parent OSW-1 to ensure their biological relevance. Known targets such as OSBP and ORP4 were used as model proteins to evaluate capture efficiency.All biotinylated OSW-1 probes retained potent cytotoxicity, confirming preserved bioactivity. Notably, the length of the linker significantly affected the ability of probes to capture target proteins. This finding suggests that optimal linker length is essential for efficient target identification and may differ from the most potent form in terms of cell activity. This study demonstrates that rational probe design such as, linker length optimization is crucial for successful chemical proteomics. Our



smart probe strategy offers a powerful platform for target deconvolution of saponin-based compounds and sheds light on the multifaceted mechanism of action of OSW-1.

Online Presentation 4 (Room 3)

Three Antistress Compounds, Triethylene Glycol, Withanone, And Withaferin A Possess Cancer Preventive And Therapeutic Potential

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Recent research has well documented the molecular link between stress and carcinogenesis, as well as the positive outcomes of stress intervention in cancer therapy. Cancer stem cells (CSCs) have emerged as a new therapeutic target owing to their capability in facilitating cancer malignancy, drug resistance, and relapse. Here, three previously described antistress compounds (triethylene glycol, TEG; Withanone, Wi-N, and Withaferin A, Wi-A) were examined for their effect on the stemness and differentiation characteristics of cancer cells. Breast carcinoma, glioblastoma, and neuroblastoma cells were treated with a non-toxic concentration of TEG (0.1%), Wi-N (5 µM), and Wi-A (0.1 µM) in 2D and 3D cultures and subjected to molecular analysis. The results demonstrated that low nontoxic concentrations of TEG, Wi-N, and Wi-A suppressed CSC properties that promote cancer metastasis and recurrence through the inhibition of epithelial-mesenchymal transition (EMT) signaling. As evident by tumorsphere assays and molecular analyses of stemness-related markers (*ALDH1, CD44, NANOG, CD133, SOX2*), Wi-N- and TEG-treated cancer cells exhibited a reduction in their self-renewal capability better than the ones treated with Wi-A. In particular, TEG and Wi-N caused the differentiation of breast carcinoma, astrocytoma, and neuroblastoma cells. Each of these was supported by (i) the upregulation of *KRT18, KRT19, E-cadherin*, and downregulation of *vimentin* in breast carcinoma; (ii) increased levels of GFAP, MAP2, and PSD-95 in astrocytoma; and (iii) increased NeuN, GAP-43, and NF200 levels in neuroblastoma. Furthermore, a reduction in cancer progression-related proteins

(PI3K, N-myc) was recorded in treated cells. The results suggest that TEG and Wi-N target cancer cell stemness and induce differentiation. They hence can be recruited as cancer preventive and therapeutic compounds upon validation through clinical trials.

Online Presentation 5 (Room 3)

Photosynthetic Response of Black Glutinous Rice (*Oryza sativa var. glutinosa*) to PEG-induced Drought Stress

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Drought stress is one of the main abiotic factors interfering with plant photosynthetic efficiency. This study aims to evaluate the photosynthetic response of black sticky rice (*Oryza sativa var glutinous L*) to drought stress induced by PEG in vitro, as well as to assess the effectiveness of abscisic acid (ABA), strigolactone (SL), and their combination during the recovery phase. Seeds were planted in culture tubes containing MS medium (Murashige and Skoog). Seven days after planting, the plants were transferred to a stress medium (PEG 8%). At 14 days after planting, they were transferred to a recovery medium. Recovery treatments included control (ms0), PEG (8%), and the addition of ABA, SL, and the combination of ABA+SL. The parameters observed included chlorophyll a and b content, chlorophyll a/b ratio, total chlorophyll, carotenoid content, and stomatal density and opening. The results showed that PEG treatment significantly reduced total chlorophyll content (-37.1%) and carotenoid content (-46.6%) compared to the control and reduced the percentage of open stomata to 5.55%. Recovery with the combination of ABA and SL increased stomatal opening back to 20% and stabilized the chlorophyll a/b ratio and carotenoid content. The hormone combination synergized in optimizing the plant's morphophysiological adaptation to osmotic stress. These findings contribute to the development of hormone-based drought mitigation strategies and the potential for enhancing the physiological resilience of local rice varieties.

Keywords: ABA, Drought Stress, Black Glutinous Rice, Chlorophyll, PEG, Stomata, Strigolactone

Invited Speaker 4

Nutritional Profile and Erosive Potential of Kombucha Derived from Black, Green, and Butterfly Pea Tea

Regina Putri Virgirinia[1,2], Alzena Nahda Saphira[1], Abhista Irsa Ramadhan[1], Lukas Dwi Iswanto[1], Diena Fuadiyah[1], Yuanita Lely Rachmawati [3]

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Kombucha, a fermented tea beverage, is increasingly consumed for its potential health benefits; however, its acidic nature raises concerns regarding dental enamel erosion. This study aimed to analyze the nutritional composition and erosive potential of kombucha derived from black tea, green tea, and butterfly pea (Clitoria ternatea) tea. Each kombucha variant was prepared by fermenting sweetened tea with a symbiotic culture of bacteria and yeast (SCOBY) for 10, 15, and 20 days. The chemical profiles were evaluated by measuring total flavonoid content, phenolic compounds, and calcium levels. pH values were also recorded for each sample. To assess the erosive potential, enamel specimens were exposed to kombucha and analyzed using Scanning Electron Microscopy (SEM). Cola beverage served as a positive control for comparison. All kombucha samples exhibited low pH values (3.1–3.7), indicating acidity. Green tea kombucha showed the highest phenolic content, while butterfly pea kombucha had the highest calcium levels. Flavonoid levels varied across tea types and fermentation durations. SEM revealed enamel surface changes after kombucha exposure, although the erosion was milder than that caused by Cola. Kombucha has favorable bioactive components but still poses a mild risk of enamel erosion due to its acidity. Its erosive potential is lower than that of commercial soft drinks.

Keywords: Kombucha, Enamel erosion, Phenolic compounds, Fermented tea, Dental health

Online Presentation 6 (Room 3)

Phytochemical Characteristics of Sargassum Seaweed in Various Marine Waters of Bima District, West Nusa Tenggara

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Sargassum is a genus of brown seaweed that is known to have high bioactive potential, especially due to its secondary metabolite compounds, such as alkaloids, flavonoids, terpenoids, and steroids. In addition, Sargassum is also an abundant marine biological resource in the waters of Bima Regency, West Nusa Tenggara. This study aims to identify and compare the phytochemical characteristics of Sargassum growing in several locations in the waters of Bima Regency, namely in the waters of Tolouwi, Sarae Me'e, and Wilamaci. The series of analyses carried out included proximate analysis, mineral content, heavy metals, extraction, identification of phytochemical compounds, total phenols, nitrate levels, and testing of active compounds using the method of High Performance Liquid Chromatography (HPLC). The results showed that the chemical composition of Sargassum sp. consisted of moisture content of 17.69-22.31%, ash 23.41-29.62%, fat 0.60-0.63%, protein 3.55-4.67%, carbohydrate 43.77-52.65%, and crude fiber 3.79-5.59%. The mineral content detected included magnesium (Mg) of 9.78-21.43 mg/g, iron (Fe) 0.49-1.10 mg/g, potassium (K) 25.91-40.71%, sodium (Na) 21.22-21.68 mg/g, and calcium (Ca) 19.05-31.89 mg/g, with Na:K ratio ranging from 0.67-0.89 mg/g. The heavy metal content in the samples was detected to be very low, at <0.003 to <0.005 ppm. The methanol extract of Sargassum sp. contains bioactive compounds such as flavonoids, alkaloids, and terpenoids. Total alkaloid content reached 183.5 mg GAE/g, while total flavonoids amounted to 497.6 mg GAE/g. Antioxidant activity measured through IC_{50} value showed a result of 69.41 mg/L, which indicates moderate antioxidant potential. Sargassum from the sea waters of Bima, West Nusa Tenggara has a rich and diverse chemical composition, with the main content of carbohydrates (43.77-52.65%), ash (23.41-29.62%), and water content (17.69-22.31%), total flavonoids reaching 497.6 mg GAE/g and alkaloids 183.5 mg GAE/g.

Online Presentation 7 (Room 3)

Metabolite Profile and Antioxidant Activity of *Muntingia calabura* Leaf Extract

Cynthia Putri Yuwana[1]*, Fadita Nurul Aini[1], Windri Handayani[1,2], Tety Maryenti[1,2], Yasman Yasman[1,2]

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Indonesia, as a nation with abundant megabiodiversity, possesses a significant wealth of natural medicinal resources, among which is *Muntingia calabura*[1]. The utilisation of this plant as a traditional medicine has become widespread in Indonesian communities and extended to various other countries, including the Philippines[2]. These acknowledged therapeutic benefits are attributed to the presence of bioactive compounds contained within *Muntingia calabura*, which exhibit diverse biological activities. To identify the metabolite profile of the *Muntingia calabura* leaf extract, analyses were conducted using gas chromatography-mass spectrometry (GC-MS). This analysis successfully identified approximately 38 compounds, including 7-methoxyflavanone, 5-hydroxy-7-methoxyflavanone, 7-hydroxyflavanone, 2',6'-dihydroxy-4'-methoxychalcone, benzoic acid, catechol, 2-methoxy-4-vinylphenol, 2,3-dimethoxyphenol, pyrogallol (1,2,3 benzenetriol), and butyrovanillone, all of which belong to the phenolic compound group. Subsequently, an investigation into the antioxidant activity of the *Muntingia calabura* leaf extract was performed using the DPPH (2,2-diphenyl-1-picrylhydrazyl), TFC (Total Flavonoid Content), and TPC (Total Phenolic Content) methods. The assay results demonstrated an IC50 value for DPPH radical scavenging activity of 123.57 µg/mL, a TFC of 61.36 mg QE/g extract, and a TPC of 28.74 mg GAE/g extract. Although the IC50 value for DPPH activity was considered moderate when compared to some other plant extracts or standard antioxidants, the notably significant TFC and TPC results nonetheless indicate that the *Muntingia calabura* leaf extract possesses antioxidant potential. This is further supported by the metabolite profile analysis, which identified various types of bioactive compounds, including several phenolic compounds, strongly believed to contribute to this antioxidant potential. This research is expected to provide valuable additional information regarding the bioactive compounds in *Muntingia calabura* and its potential for traditional medicinal applications.

Online Presentation 8 (Room 3)

Potential Compound Candidate From Nutmeg Leaves (*Myristica fragrans*) On Antiaging Target As A Cosmetic Innovation With An In-Silico Approach

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Premature aging due to extrinsic factors is a complex biological process, primarily caused by collagen degradation mediated by Matrix Metalloproteinases (MMPs), such as MMP-1, MMP-3, MMP-9, and MMP-13. These enzymes become overactive from prolonged UV exposure, leading to photoaging and inflammation triggered by Reactive Oxygen Species (ROS). Natural compounds with bioactive properties are being explored as alternative antiaging agents. This study investigates the potential of nutmeg (Myristica fragrans) leaf compounds to inhibit MMPs using an in silico molecular docking approach.The study utilized molecular docking to predict interactions between bioactive compounds in nutmeg leaves and the MMP target proteins. Protein structures were obtained from the Protein Data Bank, and compound structures were retrieved from chemical databases. AutoDock Vina was used for docking simulations to estimate binding affinities. Toxicity and drug-likeness were evaluated using pkCSM, SwissADME, and Lipinski's Rule of Five. Compounds with high binding affinity and favorable pharmacokinetic profiles were selected for further analysis.Docking simulations showed several nutmeg leaf compounds with strong binding affinities to MMP-1, MMP-3, MMP-9, and MMP-13, indicating potential inhibitory activity. Key hydrogen bonds and hydrophobic interactions were identified at the active sites of the proteins. Toxicity and pharmacokinetic predictions indicated acceptable safety and drug-likeness profiles, reinforcing their potential for cosmetic application. Nutmeg leaf-derived compounds show promising antiaging potential by inhibiting MMPs involved in collagen breakdown. These findings support the development of nutmeg-based natural cosmetic ingredients to maintain skin firmness, elasticity, and hydration. Further experimental validation is recommended to confirm their efficacy and safety for commercial use.

Online Presentation 9 (Room 3)

The Reducing pH Of Red Mud Using *Citrus aurantiifolia* Swingle At Ambient Temperature

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Red mud (RM) is a solid waste as by-product of the processing of bauxite ore with caustic soda in alumina (Al_2O_3) production. In its treatment, RM is stacked in an open area which can lead to the infiltration of harmful chemical compositions from the mud into the environment. Therefore, RM must be properly treated to prevent environmental contamination. One approach to RM treatment is by lowering the mud's pH or through a neutralization process. A method to reduce the pH of RM is using lime. Lime (Citrus aurantiifolia) is a natural material that is abundant in availability. Of course, lime offers a highly economical process for protecting the environment from the hazards of RM. This paper will discuss the results of a study on RM neutralization using lime. The lime concentration is set as an independent variable affecting the reduction in mud pH.

Keywords*:* waste, red mud, lime, organic

Online Presentation 10 (Room 3)

Targeting Inflammation and Oxidative Stress: In Silico Profiling of Bioactive Compounds from Biotransformed Oil Palm Leaves

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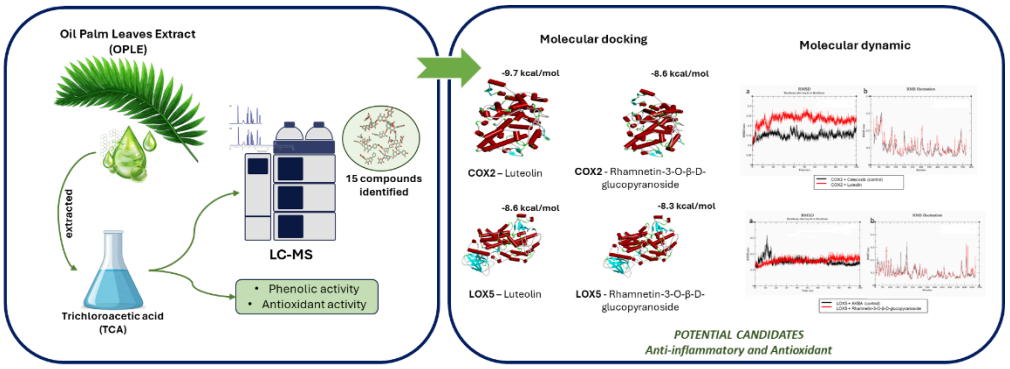
Oil palm leaf extract (OPLE) is a rich source of bioactive compounds, such as phenolic acids and flavonoids, recognized for their antioxidant and anti-inflammatory properties. Biotransformation enhances the bioavailability and efficacy of these compounds by modifying their structures. However, the medicinal use of ople remains uncommon and limited. This research aims to optimize the extraction methods of ople and demonstrate the potential anti-inflammatory activity of its compounds. Here, we performed optimization of extraction methods of OPLE using TCA, and LC-MS analysis, followed by prediction of biological activity. Subsequently, a molecular docking using PyRx and molecular dynamic analysis using GROMACS was done to investigate the protein-ligand interaction. The extraction technique was optimized by incorporating trichloroacetic acid (TCA), achieving optimal results after 48 hours of incubation. Subsequently, LC-MS analysis identified 15 compounds, two of which: (-)-epicatechin-3-O-β-D-allopyranoside and genkwanin, were present in low abundance. Using the PASS server, we predicted that kaempferol-3-O-rutinoside and rhamnetin-3-O-β-D-glucopyranoside would exhibit strong antioxidant potential. Docking studies, conducted using PyRx software, revealed high binding affinities of rhamnetin-3-O-β-D-glucopyranoside and luteolin for LOX5 and COX2, suggesting potential anti-inflammatory effects. Molecular dynamics simulations performed with GROMACS showed greater RMSD stability for the LOX5 and rhamnetin-3-O-β-D-glucopyranoside complex compared to the COX2 and luteolin complex. However, ADME analysis indicated that rhamnetin-3-O-β-D-glucopyranoside had lower bioavailability than luteolin, which may limit its drug potential despite its stronger binding stability. In conclusion, this study optimized ople extraction and identified bioactive compounds with antioxidant and anti-inflammatory potential through COX2 and LOX5 pathways. Further research is needed to enhance bioavailability for drug development.



Online Presentation 11 (Room 3)

Phytochemical Characterization and Antioxidant Potential of *Artemisia vulgaris* from Indonesia

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Artemisia vulgaris L., commonly known as mugwort, is a globally recognized medicinal plant with a rich history in traditional medicine, valued for its diverse therapeutic properties, including significant antioxidant potential[1,2,3,4]. Driven by the increasing global interest in natural products and the World Health Organization's emphasis on scientifically validating traditional remedies, this study aimed to identify the bioactive compounds and evaluate the antioxidant activity of *A. vulgaris* grown in Indonesia[5,6]. Dried *A. vulgaris* leaves were pulverized and subjected to methanol and ethanol extraction for phytochemical profiling, and methanol extraction for antioxidant assays. Metabolite profiles of the extracts were identified using Gas Chromatography-Mass Spectrometry (GC-MS). Antioxidant capacity was determined via the DPPH (1,1-diphenyl-2-picrylhydrazyl) assay, alongside measurements of Total Phenolic Content (TPC) and Total Flavonoid Content (TFC). GC-MS analysis revealed four distinct compounds in both methanol and ethanol extracts. The antioxidant assay indicated a low antioxidant activity for the methanol extract of *A. vulgaris* leaves, with an IC50 value of 206 µg/mL. Average TPC ranged from 20.6 to 22.33 mg GAE/g extract, while average TFC ranged from 17.99 to 18.95 mg QE/g extract. Despite the observed low antioxidant activity, the identification of these bioactive compounds through comprehensive phytochemical analysis provides crucial foundational data. This research significantly contributes to the understanding of the phytochemistry and therapeutic potential of *A. vulgaris* originating from Indonesia, thereby supporting its future development as a phytopharmaceutical raw material.

Keywords: *Artemisia vulgaris*, GC-MS, ethanol, methanol, antioxidant.

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Online Presentation 12 (Room 3)

Improving The Viscosity Of Ca-Bentonite Mud With *Aloe Vera* Leave As Thickener Agent

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In the process of drilling oil wells, a drilling mud consisting of bentonite and water is required. Generally, a drilling mud is made from Na-bentonite, which expands easily in water. However, Na-bentonite must be supplied from abroad which is expensive. Therefore it is required to use local bentonite as called as Ca-bentonite which is cheaper and abundant. However, the main drawback of Ca-bentonite drilling mud is its difficulty in achieving the viscosity required by API 13A standards. To be suitable for drilling mud, the viscosity of Ca-bentonite drilling mud must be modified. This article will discuss the study to improve the viscosity of drilling mud Ca-bentonite water base using the extract of aloe vera leaves. The use of natural materials is intended to be more economical.

Keywords: drilling, bentonite, aloe vera, mud, viscosity

Online Presentation 13 (Room 3)

CRISPR/Cas9-Mediated Mutagenesis of *Non-dormant Axillary Bud 1* (*SbNAB1*) Genes in Sorghum Alters Strigolactone Biosynthesis

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Strigolactones are plant hormones that play a pivotal role in regulating axillary bud outgrowth and plant architecture. In sorghum (*Sorghum bicolor*), the *Non-dormant Axillary Bud 1* (*SbNAB1*) gene is hypothesized to be involved in strigolactone biosynthesis and bud activity. This study aimed to generate targeted mutations in the *SbNAB1* gene using the CRISPR/Cas9 system to investigate its functional role. A single-guide RNA (sgRNA) was successfully designed and inserted into the binary vector pRGEB32. The recombinant plasmid was confirmed and successfully introduced into both *Escherichia coli* and *Agrobacterium tumefaciens*. Molecular confirmation through PCR revealed the successful amplification of the hygromycin phosphotransferase (HPT) gene at ~450 bp and the targeted *SbNAB1* sequence at ~400 bp. These results indicate that the gene construct was successfully assembled and mobilized into bacterial hosts for further transformation into sorghum. The findings provide a foundational step toward functional genomic studies and genetic improvement of sorghum through genome editing of the strigolactone biosynthesis pathway.

Online Presentation 14 (Room 3)

AMPD1 and MTHFR Genes Are Not Associated With Calcium Levels In Rheumatoid Arthritis Patients With Methotrexate Therapy In Indonesia

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Rheumatoid Arthritis (RA) is a chronic and progressive autoimmune disease that afects synovial tissues has greater risk of developing secondary osteoporosis (OP). In particular, polymorphisms in Adenosine Monophosphate Deaminase 1 (AMPD1) and Methylenetetrahydrofolate Reductase (MTHFR) affect the outcome of methotrexate (MTX) treatment in patients with RA. Therefore, this study aimed to determine the association of AMPD1 rs17602729, MTHFR C677T, and MTHFR A1298C polymorphisms with MTX activity in RA patients. A retrospective design was adopted to collect data from medical records and blood samples of 99 patients experiencing outpatient care at a referral hospital in Bandung. The inclusion criteria were patients diagnosed with RA, aged 18–59 years, and receiving MTX therapy for ≥ 6 months. DNA was isolated and then amplified using Polymerase Chain Reaction (PCR), and genotyping was performed with Sanger sequencing. The kinetic photometric method was used to measure the levels of calcium in the samples. The results showed that there is no significant association between the MTHFR C677T genotype variant or allele with calcium levels, as indicated by p-values of 0.177 and 0.174, respectively. The association between the MTHFR A1298C genotype variant or alleles with calcium levels was also not significant ($p = 0.206$ and $p = 0.090$, respectively). However, most patients had normal calcium levels (76 patients; 77.6%) with the MTHFR C677T genotype variant CC and the MTHFR A1298C

genotype variant AA (84 patients; 84.9%). AMPD1 rs17602729 in all patients had a CC genotype with normal calcium levels. The results suggested that there was no significant association between the genetic variation of AMPD1 rs17602729, MTHFR C677T, and MTHFR A1298C with serum calcium levels in patients with RA receiving MTX therapy.

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